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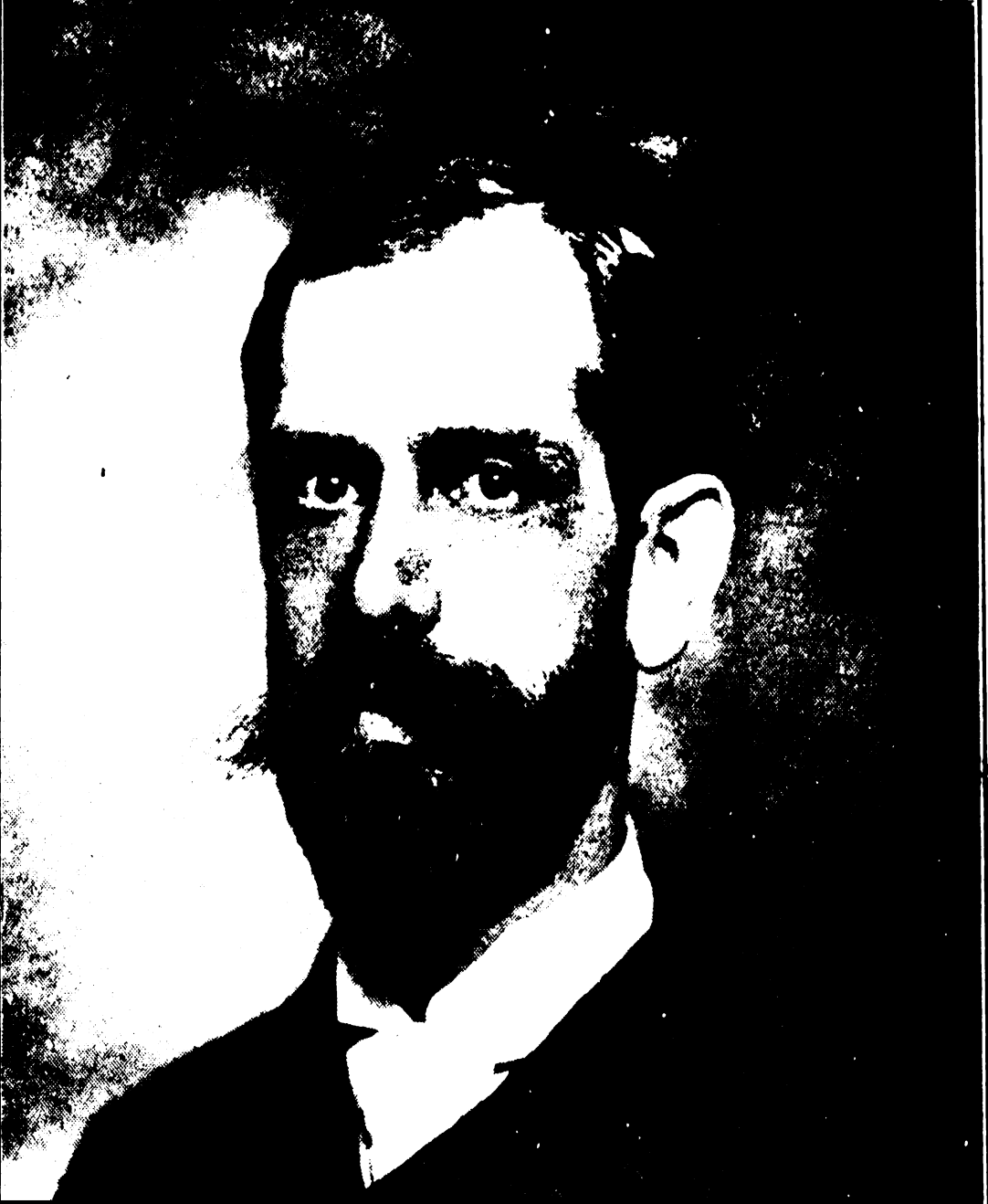

Transactions of the Colorado State Medical Society

Colorado State Medical Society

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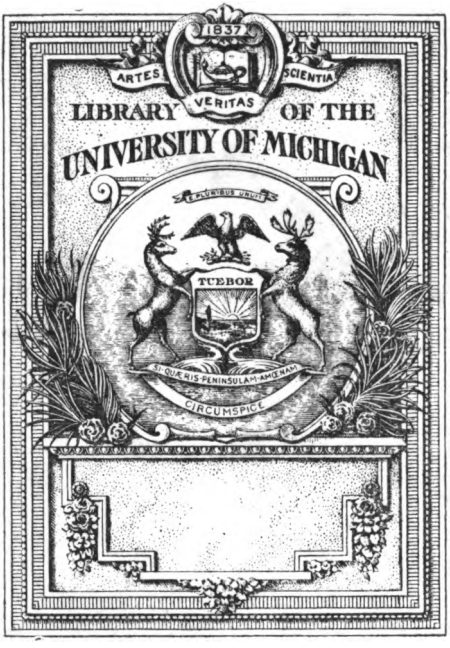

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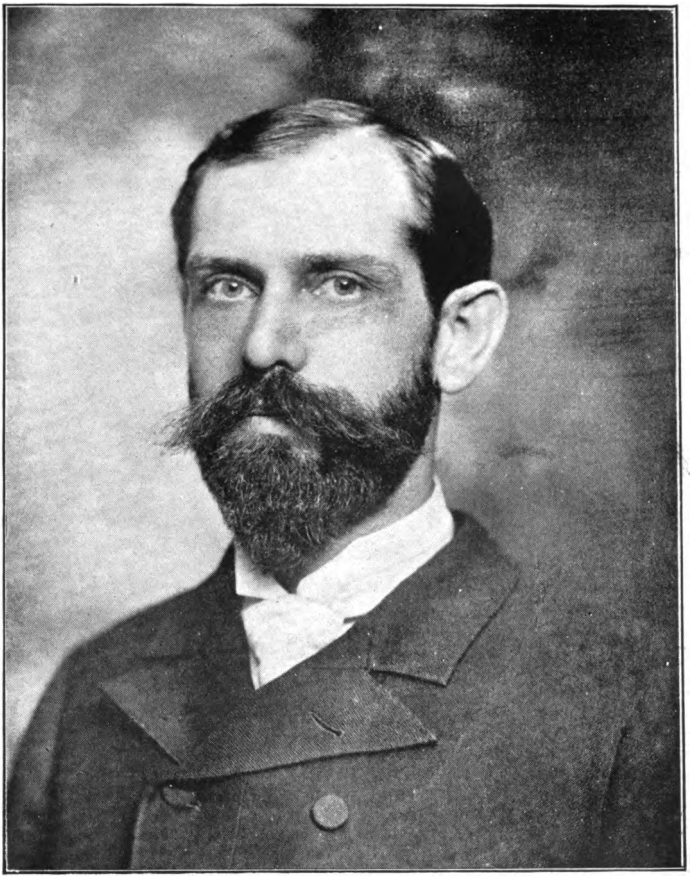

I. B. PERKINS, M. D.

PRESIDENT, 1895-1896.

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TRANSACTIONS

OF THE

Colorado

State Medical Society

TWENTY-SIXTH ANNUAL CONVENTION

By-Laws

AND

List of Members

DENVER, JUNE, 1896

COLLEGE OF PHYSICIANS
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PUBLISHED FOR THE SOCIETY

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Denver, Colorado
The Smith-Brooks Printing Company
1896

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OFFICERS

1896-1897

PRESIDENT,
Robert Levy, M. D., Denver.

FIRST VICE-PRESIDENT,
H. R. Bull, M. D., Grand Junction.

SECOND VICE-PRESIDENT,
Frank Finney, M. D., La Junta.

THIRD VICE-PRESIDENT,
S. D. Van Meter, M. D., Denver.

CORRESPONDING SECRETARY,
H. B. Whitney, M. D., Denver.

RECORDING SECRETARY,
Laura L. Liebhardt, M. D., Denver.

ASSISTANT RECORDING SECRETARY,
H. H. Bucknum, M. D., Denver.

TREASURER,
W. F. McClelland, M. D., Denver.

BOARD OF TRUSTEES,

Jacob Reed, M. D.....Colorado Springs.
Sam'l A. Fisk, M. D. .....Denver.
W. R. Whitehead, M. D. .....Denver.
A. Stedman, M. D.....Denver.
L. E. Lemen, M. D.....Denver.
W. E. Wilson, M. D. .....Denver.
Hubert Work, M. D. .....Pueblo.

COMMITTEE OF ADMISSIONS,

T. A. Hughes, M. D.....Denver.
S. D. Hopkins, M. D.....Denver.
E. Stuver.....Rawlins, Wyo.
W. W. Bulette .....Pueblo.

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STANDING COMMITTEES

(Appointed by the President)

1896-1897

Executive—C. K. Fleming, J. M. Foster, Leonard Freeman, W. A. Jayne, D. H. Coover, E. J. A. Rogers, E. P. Hershey.

Publication—H. B. Whitney, Laura L. Liebhardt, E. C. Hill, W. H. McLauthlin, E. R. Axtell, I. B. Perkins, H. G. Harvey.

Finance—H. T. Pershing, A. J. Robinson, J. Boice, J. P. Kelley, J. W. Higgins, Carl Johnson, W. H. Buchtel.

Medical Ethics—H. R. Bull, R. F. Le Mond, G. W. Miel, F. E. Waxham, C. F. Shollenberger, J. Elsner, A. G. Case.

Sanitation and Preventive Medicine—J. W. Exline, L. B. Brasher, W. W. Bulette, J. L. Clark, W. A. E. Debeque, J. T. Melvin, Will Moore.

Medical Societies—M. Kleiner, Mary L. Ambrook, P. F. Gildea, C. O. Rice, Lee Kahn, H. H. Bucknum, W. Bedell.

Necrology—E. C. Rivers, S. H. Meuer, T. G. Horn, H. Work, T. A. Stoddard, M. Harrison, C. B. Lyman.

By-Laws—J. T. Eskridge, B. P. Anderson, T. M. Burns, W. W. Grant, Sol Kahn, G. Law, C. Parkhill.

Legislative—T. H. Hawkins, P. V. Carlin, W. H. Davis, P. J. McHugh, W. A. Campbell, W. E. Wilson, L. T. Durbin.

Memorial (antivivisection)—C. Denison, W. J. Rothwell, A. S. Lobingier.

Delegates to the American Medical Association.

DELEGATES.*		ALTERNATES.	
J. W. Graham.	C. Parkhill.	B. A. Arbogast.	J. C. Hutchinson.
P. V. Carlin.	Jno. Elsner.	C. P. Conroy.	Chas. Jaeger.
J. A. Hart.	G. M. Black.	W. M. Cummings.	W. T. Liggett.
J. N. Hall.	W. W. Bulette.	E. Delehanty.	J. W. McDaniel.
J. Hawes.	S. A. Fisk.	J. F. Elliott.	J. J. Powers.
S. G. Bonney.	G. Law.	J. L. Fierstone.	O. P. Shippey.
W. J. Rothwell.	L. E. Lemen.	F. D. Green.	E. A. Sheets.
R. F. Le Mond.	S. E. Solly.	F. Finney.	D. Thompson.
W. H. Davis.	S. W. Miller.	J. C. Herrick.	A. K. Worthington.
J. W. Purcell.	W. M. Nickerson.	J. W. Hawk.	S. G. Mugrage.

*Delegates unable to attend are expected to notify the Secretary one month before the Association convenes. The Secretary will then notify the corresponding alternate.

The President will appoint other alternates in place of those unable to attend.

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List of the Presidents of the Society from its Organization

1871—*R. G. Buckingham, M. D. ..... Denver
1872— W. F. McClelland, M, D. ..... Denver
1873—*G. S. McMurtrie, M. D. ..... Central
1874—*H. K. Steele, M. D. ..... Denver
1875—*W. H. Thacker, M. D. ..... Denver
1875— H. O. Dodge, M. D. ..... Boulder
1876—*W. H. Williams, M. D. ..... Denver
1877— T. G. Horn, M D. ..... Colorado Springs
1878— A. Stedman, M. D. ..... Denver
1879— B. P. Anderson, M. D. ..... Colorado Springs
1880— F. J. Bancroft, M. D. ..... Denver
1881— H. A. Lemen, M. D. ..... Denver
1882— P. R. Thombs, M. D. ..... Pueblo
1883— W. R. Whitehead, M. D. ..... Denver
1884— Jesse Hawes, M. D. ..... Greeley
1885—*J. C. Davis, M. D. ..... Denver
1886— J. W. Graham, M. D. ..... Denver
1887— S. E. Solly, M. D. ..... Colorado Springs
1888— S. A. Fisk, M. D. ..... Denver
1889— J. W. Collins, M. D. ..... Grand Junction
1890— J. T. Eskridge, M. D. ..... Denver
1891— W. M. Strickler, M. D. ..... Colorado Springs
1892— W. E. Wilson, M. D. ..... Denver
1893— E. J. A. Rogers, M. D. ..... Denver
1894— Hubert Work, M. D. ..... Pueblo
1895— I. B. Perkins, M. D. ..... Denver
1896— Robert Levy, M. D. ..... Denver

*Deceased.

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A List of the Readers of Papers of the Session of 1896

Arbogast, B. A.
Axtell, E. R.

Bellrose, Norman W.
Black, S. Melville
Blaine, J. M.
Bonney, S. G.
Bulette, W. W.
Bull, H. R.
Burns, T. M.

Cleary, Geo.
Cochems, F. N.

Denison, Chas.

Eskridge, J. T.
Exline, J. W.

Finney, Frank
Freeman, W. L.

Gildea, P. F.
Grant, W. W.

Hall, J. N.
Hershey, E. P.
Hill, E. C.
Holmes, A. M.

Kickland, W. A.

Lee, E. A.
Le Mond, R. F.
Levy, Rob't.
Lyman, C. B.

Melvin, J. Tracy
Miel, Geo. W.
Munn, W. P.
McDermith, S. T.
McHugh, P. J.
McLauthlin, H. W.
McNaught, F. H.

Parkhill, Clayton
Pershing, H. T.
Pfeiffer, O. J.
Powers, Chas. A.

Ridlon, John
Rivers, E. C.
Rogers, E. J. A.

Stover, Geo. H.
Stuver, E.

Van Meter, S. D.

Waxham, F. E.
Wetherill, H. G.
Wooding, B. F.

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A List of Those Who Took Part in the Discussions of the Society's Papers, Session 1896

Axtell, E. R.

Black, G. Melville
Boyd, E. T.
Bulette, W. W.
Bull, H. R.

Cochems, F. N.

Denison, Chas.

Eskridge, J. T.

Finney, Frank
Freeman, Leonard

Gildea, P. F.
Grant, W. W.

Hall, J. N.
Hershey, E. P.

Kahn, Sol.

Levy, Robert

Mager, Hugo
Melvin, J. Tracy
Miel, Geo. W.
Munn, W. P.

Pershing, H. T.
Powers, Chas. A.

Robinson, A. J.
Rogers, E. J. A.
Rothwell, Wm. J.

Stover, Geo. H.
Stuver, E.
Stowe, Bond.

Van Meter, S. D.

Waxham, F. E.
Wetherill, H. T.
Wilson, W. E.
Wooding, B. F.

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NOTE

By resolution, adopted during the session of 1872, The Colorado State Medical Society does not hold itself responsible for the doctrines or statements contained in any paper published in the "Transactions."

H. B. WHITNEY, M. D.
LAURA L. LIEBHARDT, M. D.
E. C. HILL, M. D.
H. W. MCLAUTHLIN, M. D.
I. B. PERKINS,
H. G. HARVEY, M. D.
E. R. AXTELL, M. D.

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BY-LAWS.

ARTICLE I.

MEMBERS.

Any regular graduate of medicine and surgery may become a member of this Society, who, by his adherence to the Code of Ethics of the American Medical Association, shows himself entitled to the confidence and fellowship of his medical brethren, and who, by his general conduct and mode of life, proves himself worthy of being a member of one of the learned and liberal professions.

ARTICLE II.

Section 1. Every candidate for membership in the Colorado State Medical Society shall make a written application to the Committee on Admission, and such application shall be accompanied by a diploma or certificate vouching for possession of the same from some regular Medical College of good standing, and his reputation shall be vouched for, in writing, by at least two members of the Society.

Sec. 2. If this committee shall report favorably thereon to the Society, the candidate shall be balloted for, and the approving votes of three-fourths of the members present shall be necessary to his admission.

ARTICLE III.

No individual who shall be under sentence of expulsion or suspension from any State or local medical society of which he may have been a member, or whose name shall have been, for non-payment of dues, dropped from the rolls of the same, shall be received as a member of this Society, or be allowed any of

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the privileges of a member, until he shall have been relieved from the said sentence or disability by such Society, or shall have paid up all arrears of membership; nor shall any person, not a member and supporter of a local medical society, where such a one exists, be eligible to membership in the State Medical Society of Colorado.

ARTICLE IV.

Honorary membership may be conferred by a vote of two-thirds of the members present at any regular meeting of the Society, upon worthy and distinguished medical gentlemen.

ARTICLE V.

INITIATION FEE.

All the members of the Society (honorary excepted) shall, at the time of their admission, sign the Constitution and pay an initiation fee of $5, nor shall membership be consummated until the provisions of this article are complied with.

ARTICLE VI.

ASSESSMENTS.

All members shall pay such annual assessments as may be made from time to time by the Society. Said assessments to fall due at the annual meeting when made.

ARTICLE VII.

OFFICERS.

The officers of this Society shall be a President, three Vice Presidents, designated and elected specially as first, second and third Vice Presidents, a Corresponding Secretary, a Recording Secretary, a Treasurer and a Standing Committee on Admission of Members, all of whom shall be elected annually by ballot, and by a majority vote, at the regular meeting, to serve until their successors are duly elected and qualified.

ARTICLE VIII.

BOARD OF TRUSTEES.

The members of this Society shall also, at each annual meeting, elect a Board of Trustees, consisting of seven mem-

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bers—of which Board the officers-elect of this Society may constitute a part—in whom shall be vested the government of the Society and the management of its business. The Board shall be authorized to elect their own officers, and shall serve until their successors are duly elected and qualified.

ARTICLE IX.

COMMITTEES.

The following Standing Committees shall be annually appointed by the President: First, an Executive Committee; second, a Committee on Finance; third, on Publication; fourth, on Medical Ethics; fifth, on Medical Societies; sixth, on Necrology; seventh, on Legislation; eighth, on By-Laws.

ARTICLE X.

DUTIES OF OFFICERS.

It shall be the duty of the President to preside at all regular meetings of the Society, enforce a due observance of the Constitution and By-Laws, see that all members of committees and officers perform their respective duties, appoint all committees not otherwise provided for, give the casting vote only, sign diplomas and all other official documents requiring his signature and perform such duties as pertain to his office by usage and custom.

ARTICLE XI.

The Vice Presidents shall assist the President in the performance of his duties, and in his absence shall preside in order of their rank.

ARTICLE XII.

Section 1. The Corresponding Secretary shall conduct the correspondence of the society, notify the Chairmen of committees of their appointments, and request them to answer in writing whether or not they accept; give due notice of annual meetings; sign diplomas, and certify to all official acts requiring the same; receive the signature and initiation fees of all duly elected members and the annual dues of all members, transferring all moneys so received to the Treasurer; have the charge of all books, manuscripts, instruments, preparations and

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other scientific property belonging to the Society, and shall keep a catalogue of the same, and report on the condition of the same at the annual meeting. The Corresponding Secretary will receive, as compensation for the faithful discharge of his duties the sum of one hundred dollars ($100) per annum.

Sec. 2. The Recording Secretary shall keep correct minutes of the proceedings of the Society, and make a full report of the discussions on all papers, take charge of the minute books and other documents and papers read before the Society immediately at the close of each session, and keep them during the intervals, subject to the inspection of any member desirous of so doing. If necessary, in order to give a full and correct report of all proceedings and discussions, he shall, at his own expense, furnish a stenographer during the sessions of the Society. The Recording Secretary shall receive, as compensation for the faithful discharge of his duties, the sum of fifty dollars ($50) per annum.

ARTICLE XIII.

The Treasurer shall receive all moneys due to the Society, and pay all bills endorsed by the Finance Committee, and countersigned by the President, keeping correct accounts of the same and making a full and detailed report at the annual meeting.

ARTICLE XIV.

Any member who shall fail to pay his dues for a period of three years shall be dropped from the roll of membership, and so notified by the Secretary.

ARTICLE XV.

DUTIES OF COMMITTEES.

Standing committees shall keep regular minutes of their proceedings, and furnish an authentic copy to the Secretary, and make a written report at the annual meeting.

ARTICLE XVI.

It shall be the duty of the Committee on Admission, upon receiving the names of candidates for membership, to make inquiry and report such as may be found worthy, to the Society,

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which may thereupon elect him. Should the committee fail to report upon such nominations submitted to them, any members having made such nominations may renew the same directly to the Society, in which case a vote of four-fifths of the members present shall be requisite to constitute an election.

ARTICLE XVII.

The Executive Committee shall digest and prepare the business of each meeting, provide suitable rooms for the purpose of the Society, recommend plans for the promotion of its objects, and in all things protect and look after the general interests of the Society.

ARTICLE XVIII.

The Committee on Finance shall superintend the monetary affairs of the Society, inspect and audit all bills and accounts of the Treasurer, and make such an assessment, by a *pro rata* tax upon the resident members, as may be necessary for the incidental expenses, subject, however, to the approval of the Society.

ARTICLE XIX.

The Committee on Publication shall superintend the printing of such papers, with the full discussion thereon as may be ordered to be published, so that they may be issued on uniform paper. The publication of the transactions shall not be permitted until final revision of proof and its adoption, with permission to print, signed by a majority of the Committee on Publication, and under the title "*Transactions.*"

ARTICLE XX.

The Committee on Ethics shall hear all complaints of any breach of etiquette or violation of medical ethics. It shall decide all questions of ethics submitted to it. If any member shall be charged in writing by any other member of the Society with any violation of the provisions of the By-Laws, or with unprofessional conduct, a copy of such charge shall be furnished him; himself and his accuser cited to appear; when the committee shall proceed to hear the case, reserving its decision to be reported to the Society, when its action may be affirmed by a vote of two-thirds of the members present.

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ARTICLE XXI.

The Committee on Medical Societies shall consider and report on the organization of such medical societies as desire to become auxiliary to the State Medical Society, and generally take charge of this department, making at each annual meeting as complete a report as practicable.

ARTICLE XXII.

The Committee on Necrology shall report the death of any member of the Society, with a brief biography, and this report shall be published in the Transactions.

ARTICLE XXIII.

The Committee on Legislation shall report to the Society any matter concerning its welfare which requires State legislation, and see that the same is properly presented to the legislature for action, if so instructed by the Society.

ARTICLE XXIV.

The Committee on By-Laws shall report to the Society any needed change in its By-Laws.

ARTICLE XXV.

DISCIPLINE.

A member may be expelled, suspended or reprimanded by a vote of two-thirds of the members present at any annual meeting, which vote shall be had in consequence of a report from the Committee on Ethics, and which may be confirmed by a majority of the Board of Trustees.

ARTICLE XXVI.

Any member wishing to withdraw from the Society shall be permitted to do so on his written request, after he shall have presented the Treasurer's receipt for all moneys due.

ARTICLE XXVII.

The regular meeting shall be held annually, and shall commence on the third Tuesday of June of each year. The place

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of meeting shall be Denver, and a banquet shall be given on the evening of the last day, as arranged for by the Executive Committee.

ARTICLE XXVIII.

Special meetings shall be called at any time by the Board of Trustees.

ARTICLE XXIX.

At all meetings the presence of nine resident members shall be necessary to constitute a quorum.

ARTICLE XXX.

The order of proceedings shall be as follows:

1. Opening of meeting by prayer.
2. Reading of minutes by Secretary.
3. Annual address by retiring President.
4. Annual reports of Officers and Standing Committees.
5. Election of Officers.
6. Annual and Special Committees' reports.
7. Voluntary papers, contributions, reports.
8. Annual assessment shall be laid by resolution.
9. Miscellaneous business.
10. President-elect shall assume the chair and announce committees for succeeding year.

ARTICLE XXXI.

These By-Laws may be repealed, annulled, altered or amended at a regular meeting, on the recommendation of two-thirds of the members present.

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MINUTES

OF THE

TWENTY-SIXTH ANNUAL SESSION

OF THE

Colorado State Medical Society

HELD IN

DENVER, JUNE 16, 17 AND 18, 1896.

TUESDAY, JUNE 16, 1896.

MORNING SESSION.

The Society was called to order at 9:45 a. m., in the ordinary of the Brown Palace hotel, by the President, Dr. I. B. Perkins.

Prayer was offered by Rev. E. J. Seldon.

The Secretary's report was submitted as printed in the Transactions of 1895. The report was accepted.

Dr. John M. Foster, chairman of Executive Committee, submitted the printed programmes of the session and made some announcements.

The Corresponding Secretary, Dr. E. R. Axtell, presented his annual report, as follows:

Mr. President and Members—The property of this Society in my hands is in good condition. A complete set of new books for the record of the fees and dues of the members has been arranged. The bills for dues were gotten out every

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three months during the past year. In the year I collected and turned over to the Treasurer, Dr. McClelland, $487.04. This was $142.96 less than was collected last year, which was the banner year for collections in the Society.

In the course of the year seven of our members died, three left the state and the following members were dropped for non-payment of dues: Drs. Bancroft, J. A. Baker, Collins, Grissom, Rader, Sleicher, Shaw, Weiss.

There are seventeen members who owe the Society $15, and who will be dropped unless they soon pay their fees.

During the past year the following communications have been received by me which demand the Society's attention. The first is in relation to the resolutions adopted last year censuring The New York Life Insurance Company for reducing its medical examiner's fee. It is as follows:

New York, July 5, 1895.

We beg to acknowledge receipt of resolutions offered at the recent meeting of your State Society, and say in reply thereto that the information in possession of your Society is not correct, as this company has not cut the customary medical fee from $5 to $3. The only exception to this is where in some places the Company has made an arrangement with its medical examiners under which it offers a *quid pro quo* entirely satisfactory to all parties concerned.

The resolutions, therefore, as we take them, come entirely outside of the suggested application to this company.

Yours truly,

O. H. ROGERS, M. D., Assistant Medical Director.

New York, December 14, 1895.

I am in receipt of the invitation of the Colorado State Medical Society to the Americal Neurological Association to meet in Denver in June, 1897 or 1898. The present council has no power either to accept or decline the invitation. I will, however, present your letter to the council for 1897.

In the meantime, please present the thanks of the American Neurological Association to the Colorado State Medical Society for their courtesy, which is greatly appreciated.

Very truly yours,

GRAEME M. HAMMOND, Secretary.

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Grand Rapids, Mich., January 28, 1896.

At the last meeting of the Michigan State Medical Society a committee (of which I am secretary) was appointed to consider means relative to promoting more complete or systematic organization of the medical profession throughout the country.

In accordance with the request of the committee, I ask you to read carefully the enclosed "Address" and to present the subject, by means of the "Synopsis," to your State Society.

Our committee earnestly desires that some concert of action may be had in the matter, and to that end takes the liberty of urging you to use all proper means to have a committee appointed whose duty it shall be to confer, by letter or in person, with similar committees from the other state societies for the purpose of formulating some plan that may be presented for adoption by the state societies next year.

Please let me hear from you at your earliest convenience.

Very respectfully,

R. J. KIRKLAND.

PLAN OF ORGANIZATION OF THE MEDICAL PROFESSION OF THE UNITED STATES.

First—Every local society in good standing shall be a part of the state society and under its government.

Second—Every state society shall be a part of the national society.

Third—No local society shall be represented in the national organization except through its state society.

Fourth—A man, by joining his local society, becomes, by that one act, a member of the state and national societies, and can join such societies in no other way. In this way the local society would guard the avenues of entrance.

Fifth—To the annual dues demanded by and payable to the local society would be added $3 for the state and $5 for the national organizations, and would entitle the member to the transactions of both.

Sixth—The degree of "Fellow of the Americal Medical Association" should be created, and every man qualified to join his local society would be entitled to bear this degree.

Seventh—In the national society should be formed an executive board (from the presidents of the state societies, or

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otherwise) which should, among other duties, exercise supervision over the various state societies; and in the state society a similar board, which should exercise similar jurisdiction over the local societies.

According to this plan a man can join the state and national societies only by being accepted by the local society, where he is known. Thus, fewer unworthy men would gain entrance to our national society. By the payment of ten dollars and signing such constitution as may be required, the member would be entitled to the transactions of both his state society and the national organization, and would be entitled to write himself "Fellow of the American Medical Association."

Washington, D. C., May 22, 1896.

I beg leave to call your attention to copies of a pamphlet containing the resolutions of various medical and scientific societies in opposition to the bill which has been introduced in congress for the restriction of animal experimentation in the District of Columbia, which I send you in a separate enclosure.

It is important that the medical profession in all parts of the country should be heard from in opposition to this bill, which is intended as an entering wedge by the anti-vivisectionists. If they are successful here they will, no doubt, seek similar legislation in the different states. Permit me to suggest that you bring this matter to the attention of your State Medical Society at its coming meeting, and that resolutions be submitted embodying the views expressed in the resolutions of the Americal Medical Association. It would be well for your most influential members to communicate directly with their representatives in congress protesting against this legislation. If resolutions are adopted by your Society they could be sent to one of your senators, who would, without doubt, introduce them and have them referred to the proper committee.

Very truly yours,

GEO. M. STERNBERG, Surgeon General, U. S. A.

Watertown, N. Y., June 1, 1896.

As president of the medical society of the state of New York, I would say that we have found it of material advantage having the annual meeting in Albany during the session of the

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legislature, an advantage which has resulted in the enactment of excellent health and medical education laws for the state of New York.

It has occurred to me that a similar advantage could be realized by the country at large, by the organization of a small delegated body, representing each state medical society in the United States, such body to meet at Washington for a brief period once each year during the session of congress.

These meetings could be arranged subject to call and held during the pendency of important legislation, relative to the various medical branches of the public service and of the medical profession, also for advice and consultation regarding state medical society affairs. You can readily see the advantage it would be to each state medical society.

I therefore ask you to kindly co-operate with this society and with the medical societies of other states, by appointing a delegation of three with three alternates, to attend a conference and formulate a definite organization, to be held sometime during the ensuing year; probably next February or March, at Washington, D. C.

Kindly advise me of any action your Society may take, together with the names and addresses of such delegates and alternates as may be chosen. As soon as we receive returns from the other state societies which are yet to meet, a call will be issued.

Very sincerely,

JAMES D. SPENCER, President.

The Treasurer, Dr. W. F. McClelland, then presented the following report, which was referred to the Finance Committee:

Mr. President and Members of the State Medical Society—I herewith hand you Treasurer's report to June 15, 1896, to-wit:

Cash balance on hand, June 18, 1895	$ 271 26
Annual dues collected	1,222 04
Total	$1,493 30
Disbursements during year	$1,017 09
Cash balance on hand	476 21
	$1,493 30

All of which I respectfully submit.

W. F. McCLELLAND, Treasurer.

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The following report of the Publication Committee was read by the chairman, Dr. E. R. Axtell:

The Publication Committee during the past year published the Transactions within twelve weeks from the adjournment of the Society. The volume consisted of 551 pages and an edition of 400 copies was received. It contained fifty-nine papers and their discussions, together with the usual minutes, Constitution, By-Laws, etc. The entire edition was bound in cloth and was sent to the members of the Society, to the various state societies in the United States, to the medical libraries and to the larger medical journals.

For the first time in the Society's history, half-tones of all the Presidents of the Society were published, and this feature of the book makes it of special value. The collection of these photographs was taken in hand by Dr. Liebhardt, a member of the committee, to whom I, as chairman, publicly return thanks.

To Dr. M. A. Walker, of the committee, the Society is indebted for the excellent index.

In the style of binding and in the general make-up of the book, our proceedings rank well with those of any state.

E. R. AXTELL, M. D., Chairman.

The above was adopted as read.

The Committee on Medical Societies reported through its chairman, Dr. S. D. Van Meter, as follows:

To secure a report from the different medical societies throughout the state, on the 1st of April I addressed the following letter to the secretaries of the different societies whose addresses I could obtain:

Denver, Colo., April 1, 1896.

My Dear Doctor—As chairman of the Committee on Medical Societies, I would like to make as full a report as possible at our annual June meeting of the State Society, and I shall be very much obliged if you will kindly make me a report of your society meetings throughout the past year, ending with the 1st of May. I have endeavored to secure a report from every society throughout the state, and if the secretary of any society has failed to receive a request from me for a report,

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it is not because I have overlooked him, but because I have been unable to secure his name and address. Should you know of any newly organized medical body, kindly state to the secretary of the same that I shall be pleased to have a report from him to embody in mine for the annual state meeting.

Most respectfully and fraternally yours,

S. D. VAN METER.

In reply to these and to personal requests, the following reports from the secretaries of their respective societies were received:

THE PUEBLO COUNTY MEDICAL SOCIETY.

E. L. Woods, M. D., president; Mary F. Barry, M. D., secretary.

Number of members, 26.

Number also members of State Society, ——

Number of meetings, 9.

Average attendance, 15.

Papers read, 11.

Papers:

1. Nervousness of Girls, Dr. Hubert Work.
2. Medical Reflections, Dr. H. K. Palmer.
3. Some Odd Remedies, Dr. E. L. Woods.
4. Pulmonary Consumption, Dr. W. H. Baker.
5. Climatology, Dr. J. A. Black.
6. Artificial Anaesthesia, Dr. M. F. Barry.
7. General Treatment of Diseases of Skin, Dr. Blaine.
8. A Case of Asthma Due to Nasal Polypi, Dr. W. W. Bulette.
9. Malarial Fevers, Dr. L. MacLean.
10. Peritonitis, Dr. T. A. Stoddard.

During the year we have lost one member by death, Dr. H. K. Palmer. Four have removed from the county and four new members have been received in the society. Through the earnest efforts of Dr. W. W. Bulette, a foundation has been laid for a medical library.

MARY F. BARRY, M. D., Secretary.

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EL PASO COUNTY MEDICAL SOCIETY.

Dr. P. F. Gildea, president; Dr. C. F. Gardiner, vice president; Dr. W. F. Martin, secretary and treasurer.

During the past year six regular meetings have been held; three formal papers have been read, viz.: Enuresis, with Clinical Reports of Infantile Cases; the New Photography, and three general discussions on the following subjects: Post-Nasal Growths, Tuberculosis, and The Treatment of Pulmonary Hemorrhage.

In addition to these papers and discussions, a number of interesting clinical histories have been presented to the society, and demonstrations of specimens and of the Roentgen rays given.

The membership of the society at present numbers twenty-six active and one honorary member. The average attendance of members is eight. Visiting physicians are frequently, indeed generally, in attendance as well.

The society possesses a medical library, which is steadily increasing in size, and is free to the members.

DR. W. F. MARTIN, Secretary and Treasurer.

THE DENVER MEDICAL COLLEGE ALUMNI ASSOCIATION.

(Incorporated.)

E. A. Sheets, M. D., president; A. R. Seebass, M. D., secretary.

Number of members, 104.

Average attendance, 15.

Number of papers, 17.

Specimens exhibited, 12.

A. R. SEEBASS, M. D., Ph. G., Secretary.

THE ALUMNI ASSOCIATION OF GROSS MEDICAL COLLEGE, DENVER, COLO.

(Incorporated.)

Organized April 11, 1894.

Edward Curtis Hill, M. Sc., M. D., president; Samuel H. Meuer, M. D., secretary.

Number of members, 96.

Number of meetings: Monthly, 9; annual, 1; special, 1.

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Average attendance, 12.

Title of papers:

Nursing, Dr. Una Roberts.

Onset of Fever, Dr. T. M. Burns.

Urethritis, Dr. Samuel Mugrage.

Erysipelas, Dr. Saling Simon.

Urinalysis, Dr. Shippey.

Puerperal Infection, Dr. T. M. Burns.

Albuminuria as a Complication, Dr. D. S. Neuman.

The Use of Permanganate of Potash in Morphine Poisoning, Dr. S. H. Meuer.

Purpura Rheumatica, Dr. A. E. Grant.

Multiple Neuritis, Dr. Hattie Bedortha.

In addition, there have been twenty-six cases reported and discussed before the society.

Number of members who are members of the State Society, 16.

Date of meetings, first Thursday of each month. Annual meeting on day following commencement exercises of Gross Medical college. S. H. MEUER, M. D., Secretary.

FREMONT COUNTY MEDICAL SOCIETY.

J. M. Bradbury, M. D., president; F. N. Carrier, M. D., secretary.

Number of members, 16.

Number of meetings, 6.

Papers:

Dr. T. B. Moore, Antitoxin.

Dr. Peare, Proprietary Medicine.

Dr. Peare, Should Physicians as Such be Skeptics?

Dr. Bradbury, Arsenauro.

January 6, 1896, Case Reports.

Dr. Little, Diagnosis and Treatment of Valvular Heart Disease. F. N. CARRIER, Secretary.

BOULDER COUNTY MEDICAL SOCIETY.

No activity; not a quorum this year. No election of officers. M. F. LOWREY, M. D., Secretary.

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WELD COUNTY MEDICAL SOCIETY.

President, Dr. G. H. Stover; vice president, Dr. F. R. Carter; secretary and treasurer, J. F. Kearns; executive committee, Dr. G. H. Stover, Dr. Jesse Hawes, Dr. J. K. Miller.

Number of meetings, 4.

Title of papers:

1. Woodbridge Treatment of Typhoid Fever, Dr. Jesse Hawes.
2. Movable Kidney, Dr. J. K. Miller.
3. Bleeding in Pneumonia, Dr. Franklin Burr.
4. Legal Medicine, Dr. G. Law.

J. F. KEARNS, Secretary.

THE DENVER CLINICAL SOCIETY.

Incorporated June 1, 1896.

Dr. Eleanor Lawney, president; Dr. Love, first vice president; Dr. Charlotte C. Goodman, second vice president; Dr. Hattie Bedortha, treasurer; Dr. M. Jean Gale, secretary.

Twenty-one regular meetings.

One called meeting.

Fifteen papers were read.

Nineteen members.

Subject of papers as follows:

Food Poisons, Dr. Lawney.

Hay Fever, Dr. Bedortha.

Degeneration of Placenta, Dr. Lawney.

Electricity in Gynecological Work, Dr. Love.

Interesting Points in the Diagnosis of Diphtheria, Dr. Bedortha.

Public Sanitation, Dr. Annie Williams.

Gonorrhoea in Women, Dr. Sarah J. Fearing.

Acute Rheumatism, Dr. Love.

Haig's Uric Acid Theory, Dr. Gertrude Van Pelt.

Antitoxin in Diphtheria, Dr. Una G. Roberts.

Syphilitic Pharangitis, Dr. Bedortha.

Glaucoma, Dr. M. Jean Gale.

Thoracic Aneurism, Dr. Milligan.

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Intestinal Parasites, Dr. Ida N. Beaver.
Urinalysis, Dr. Charlotte Goodman.
Adenoids, Dr. Josephine G. Peavey.

M. JEAN GALE, Secretary.

THE DENVER CLINICAL AND PATHOLOGICAL SOCIETY.

Wm. B. Craig, M. D., president; Lewis M. Walker, M. D., secretary.

Membership limited to 40.

Number of meetings since last report, 9.

Present number of members, 38.

Present number of members also members of State Medical Society, 33.

Average membership, 37.

Average attendance, 22.

Number of cases reported, 101.

Number of pathological specimens, surgical instruments and appliances exhibited, 33.

Number of members taking part in the discussion of cases, 16.

Meetings are held on the second Friday evening of each month from October to June, inclusive.

In November last the society had the misfortune to lose one member, Dr. Chas. S. Manly, by death.

The past year has been without question the brightest in the history of this society.

LEWIS M. WALKER, Secretary.

THE LAKE COUNTY MEDICAL ASSOCIATION.

President, D. Heimberger, M. D.; secretary, Lee Kahn, M. D.

Number of members, 15.

Number of members also members of State Medical Society, 7.

New members, 3.

Honorary members, 1.

Members died, 2.

Number of meetings, 12.

Average attendance, 8.

Meetings every second Thursday.

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Papers read and subjects presented for discussion, 6.

The death of Drs. D'Avignon and Bosanko seemed to cast a gloom over the entire community, and the association lost two of its oldest and staunchest members.

Unfortunately, the members of the association in this county do not seem to care to attend meetings, and it is, therefore, almost impossible to keep up interest among the few regular attendants.

We had very good meetings (when we had any) both on account of the discussions as well as the social features, and when we were called upon to take action on the deaths of two of our best members, we claimed the attention of almost every member in Lake county, and why such lack of interest is shown at the regular meetings it is impossible to determine. I trust it will not always be so. If it can be done, we will revivify our energies and have a better report for our next state meeting. LEE KAHN, Secretary.

THE DENVER OBSTETRICAL AND GYNAECOLOGICAL SOCIETY.

The Denver Obstetrical and Gynaecological Society has had no meeting for more than a year. Therefore, it seems to me, it would be better to drop it from your list.

C. K. FLEMING.

THE DENVER AND ARAPAHOE MEDICAL SOCIETY.

Robert Levy, president; S. D. Hopkins, secretary.
Total attendance, 532.
Number of meetings, 14.
Special meetings, 2.
Average attendance, 33 1-4.
Papers read, 20.
Cases reported, 13.
Members elected, 26.
Titles of papers read:
Pelvic Abscess with report of two cases.
Puerperal Spanaemia.
Encephaloid Cancer Situated on Anterior Surface of Lumbar Vertebrae.
Tubercular Meningitis.
Functional Heart Disease.

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Short Period of Immunity Produced by Antitoxine.

Pneumo-pyo-Thorax Complicating Pulmónary Tuberculosis.

Multiple Costal Resection (modified from Etlander) with report and exhibit of case.

Report of Recent Operations for Benign and Malignant Tumors.

Castration for Hypertrophy of Prostate.

Suppurative Parotitis.

Should Ocular Strabismus in Adults be more frequently Operated on?

Morphology of Blood a Factor in Diagnosis.

Foreign Body in Right Bronchus, recovery after six days' retention.

Resection of Vas Deferens for Hypertrophy of Prostate.

A Binocular Magnifying lens for examination of eye by oblique illumination and for other purposes.

The question of Position in the treatment of fractures at the lower end of humerus.

A case of Erysipelas complicating Pregnancy.

Unusual cause and termination of a pelvic abscess.

Two of our meetings were devoted to the demonstration of the Roentgen rays. In the former meeting, the history of the rays was considered in detail, with a complete demonstration of the experiments with the Crooks tubes. In the latter demonstration, all the experiments connected with the Roentgen rays were shown, also stereoptican views of skiagraphs. In this meeting a paper was read entitled "The Application of the Roentgen Rays to Surgery."

During the year we framed and adopted a fee bill.

S. D. HOPKINS, Secretary.

The above reports show the society work done throughout the state during the past year. On the whole, I think it is very promising. Although there are some societies suffering from lethargy, yet most of the organizations are doing good work.

S. D. VAN METER,
Secretary of the Committee on Medical Societies.

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Dr. W. E. Wilson, chairman of Committee on Necrology, read the following report:

Dr. C. W. Jenner, of Denver, died August 11, 1895. He was a graduate of the Western Reserve Medical College, class of 1882, and joined this Society in 1891. He was an invalid for a year or more, but in many ways endeared himself to his neighbors as one who was most kindly disposed to all and generous to the poor with whom he came in contact.

Dr. B. F. D. Adams, of Colorado Springs, died October 28, 1895, of pulmonary tuberculosis. He graduated both from the literary and medical departments of Harvard, the latter in 1862, and located in Waltham, Massachusetts, where he remained, with the exception of two years spent in St. Paul, Minnesota, for his health, until 1882, when he removed to Colorado Springs. He was admitted to this Society in 1888, and has been held in high esteem by those who knew him. He was a valued member of the board of trustees of Colorado College. His memory is cherished in and out of the profession by all those who love the sterling qualities of honesty of purpose and purity of character.

Dr. F. F. D'Avignon, of Leadville, died November 6, 1895. He had been for years one of the prominent physicians and surgeons of that city.

A committee appointed by the Lake County Medical Society say that in the death of Dr. Frederick D'Avignon, the medical profession and state of Colorado has lost one of its most eminent members, whose devotion to duty and zeal in his professional work was ever inspired by his love for humanity, this begetting a desire to alleviate suffering. The profession of Lake county will miss his kindly and pacific counsels in their future meetings, and in consultations they feel that in his death their loss will be almost irreparable.

Dr. Edward P. Rose died at Salt Lake City, November 6, 1895. He graduated in the College of the State of South Carolina in Charleston in 1878. He subsequently took a post graduate course in the city of New York. Coming to Colorado he located in Gunnison and subsequently in Aspen. He joined this Society in 1892. In the above mentioned localities he established a character for probity as a citizen and

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skill as a physician. The better citizens in Aspen plaintively linger on his memory and mourn him as the premature setting of a star in the medical constellation.

Dr. Charles S. Manly, of Denver, died of pulmonary tuberculosis, November 13, 1895. He graduated in the medical department of the Denver University in April, 1891. He had been an active member of the State Society since 1892. At the June meeting, in 1895, he presented a paper on the "Importance of Rational Methods in the Diagnosis of Phthisis, with Special Reference to Pre-Tuberculosis." This article was published in the Transactions of 1895, and attracted special attention, as it was generally known that the author had the disease in his own person of which he wrote. The article was conspicuous for its brevity and terseness. In November, 1894, he began the publication of the Colorado Climatologist, and continued it until his death. Had his physical powers been equal to his energy and brilliancy, he would in a few years have been a journalist of whom this commonwealth would have been proud, and the medical profession would have hailed him as the peer of the best. The various local medical societies in Denver of which he was a member adopted resolutions of high personal regard and tender endearment to his memory.

Dr. S. Arthur Bosanko, of Leadville, died of pneumonia, November 23, 1895. He was a graduate of the University of Toronto, and joined this Society in 1885. He practiced for a time in Michigan, but came to Colorado ten years ago and located in Leadville. The Lake County Medical Society expressed their "regret and deep sorrow at the blow that had so unexpectedly befallen them." They say, "it is not only as a physician and surgeon, in the foremost ranks of his profession, that we mourn his loss, but something far better—a kindly, genial, high souled man. We shall miss him in our daily work, at our councils and wherever he was wont to lend his ready and cheery influence."

Dr. Sarah J. Fearing died January 11, 1896, of pulmonary tuberculosis. She graduated at the Woman's Medical College, in Philadelphia, in the class of 1890. Finding her health failing in the rigorous climate of her native New England, she

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came to Colorado, locating in Denver, and in 1894 took the *ad eundem* degree in the medical department of the University of Colorado. She joined the State Medical Society in 1895.

The Women's Clinical Society, of Denver, at a special meeting, passed the following resolutions:

"*Resolved*, That in the death of Dr. Sarah J. Fearing this society has sustained an irreparable loss, and to each individual member has come a personal bereavement. That the memory of her devotion to her profession, her scholarly attainments, her deep human sympathy shown in her constant ministry to the poor and unfortunate, her patience and fortitude, may ever serve as an inspiration to her former co-workers and friends."

The more intimate association, together, possibly, with the greater intuition of the women of the clinical society, coupled with the modesty of Dr. Fearing, has enabled that society to more readily become pathfinders into the character and attainments of the deceased, yet it only adds fervor to our condolence and grief in the general loss as we heartily subscribe to their resolutions.

Dr. A. J. Cattanach died suddenly in Denver the 30th day of May, 1896. He was born in 1847, in Fergus, Canada. He graduated at McGill University, Montreal, at the age of 21 years. He took a post graduate course in the Royal College of Physicians and Surgeons, Scotland. For nine years he served as surgeon on an ocean steamer, crossing the ocean more than 300 times. He came to Denver in 1881, and joined this Society in 1889.

The Denver and Arapahoe Medical Society adopted the following in memory of Dr. Cattanach: "He was a colleague held in high esteem, a physician beloved by his patients, a citizen respected by all who knew him. He was the soul of honor in all transactions of life. All interests intrusted to his care were conscientiously protected, and no meanness or triviality marred the history of his intercourse with his fellow men. He was modestly retiring in character, his conduct all rectitude, and his abilities marked. Each member of the society testifies to the sense of a personal loss in his death."

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The report was accepted, and the thanks of the Society extended to the chairman and his committee for the faithful work done in collecting accurate data, etc.

Dr. J. N. Hall, chairman of Committee on By-Laws, announced that no suggestions concerning the By-Laws had been brought to the notice of the committee during the year.

Dr. J. M. Foster moved that the time consumed in the reading of papers be restricted to fifteen minutes, and that the discussions be limited to five minutes. Dr. Foster stated further that heretofore this rule had always been conformed to, but is not embodied in our By-Laws.

The motion was unanimously carried.

The first paper of the meeting was presented by Dr. G. Melville Black, of Denver, entitled "A Few Hints on the Use of the Tuning Fork in Ear Diagnosis." The paper was illustrated by charts and was discussed by Drs. P. F. Gildea and E. T. Boyd.

The two papers by Dr. Geo. Cleary, of Denver, entitled, respectively, "Purulent Myringitis in Connection with Pulmonary Tuberculosis" and "A Few Interesting Cases of Ophthalmic Surgery," were read by title in the absence of the author.

The paper of Dr. Edward Jackson, of Philadelphia, entitled "The Retinal Lesions Associated with Albuminuria," was called for, but the author was not present.

The paper of Dr. R. F. LeMond, of Denver, entitled "Characteristic Differences Between Granular Conjunctivitis and Trachoma," was read by title.

A paper on "Adenoid Vegetations, with exhibition of specimens and instruments," was then read by Dr. F. E. Waxham, of Denver. The paper was discussed by Drs. P. F. Gildea, G. Melville Black, Robt. Levy and W. W. Bulette, and was referred to the Publication Committee.

Dr. W. W. Bulette, of Pueblo, presented a paper on "Hay Fever." A discussion followed by Drs. Levy, Black and W. E. Wilson, after which the paper was referred to the Publication Committee.

A paper entitled "Pharyngeal Syphilis" was read by Dr. P. F. Gildea, of Colorado Springs, and was received and discussed by Drs. Axtell, Waxham and Levy.

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Dr. Robt. Levy, of Denver, demonstrated to each individual member present a case of "Laryngeal Papillomata by Means of Direct Autoscopy; Kirstein."

Dr. J. M. Foster announced on behalf of the Executive Committee that Thursday afternoon's session would be held in the large ball room of the Palace hotel.

Dr. Levy gave a verbal report of a "Case of Fatal Hemorrhage from Nose and Pharynx from Unusual Cause."

This closed the morning session. Meeting adjourned at 12 m.

AFTERNOON SESSION.

Meeting called to order by the President at 2 p. m. The Chair wished to know the Society's pleasure regarding the further reading of papers; whether it was the wish of the Society to begin where we left off this morning or follow the afternoon's programme as per printed schedule.

Dr. Finney moved that the printed programme as prepared for the afternoon session be followed. Carried.

Dr. E. C. Hill, of Denver, presented his paper entitled "Cloudy Urine."

Dr. Norman W. Bellrose, of Eaton, read a paper on the morning's programme, entitled "Puerperal Eclampsia, with Report of a Case and Treatment."

Dr. E. R. Axtell, of Denver, presented his paper on "Gall Stones; a Medical Review, with Exhibition of Specimens."

Dr. W. A. Kickland, of Fort Collins, followed with a paper entitled "Preparation of Antitoxin."

Dr. J. M. Blaine, of Denver, read a paper on "Acne." It was discussed by Drs. J. N. Hall and H. G. Wetherill.

Dr. W. E. Wilson here presented the supplement to his necrology report. Moved and seconded that the report be received and embodied in the original report. Carried.

Dr. B. F. Wooding, of Denver, read a paper entitled "Typhoid and Mountain Fever Not Synonymous; Their Care and Treatment." Discussion followed by Drs. Sol. G. Kahn, Melvin, Miel, Bull, W. J. Rothwell and Wooding.

A paper by Dr. Sam'l A. Fisk, of Denver, on "Treatment of Typhoid Fever," was not presented, owing to the doctor's absence from the city.

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Dr. H. W. McLauthlin read a paper entitled "History of the Recent Typhoid Fever Epidemic at Arapahoe County Hospital, with Reports of Cases," illustrated by diagram. It was moved and seconded that the time for reading of same be extended. Motion was carried. The paper was discussed by Dr. J. T. Eskridge.

The Chair announced that owing to the absence from the city of two members of the Committee on Admission, viz.: Drs. T. A. Hughes and M. A. Walker, it would be necessary to supply said vacancies. Thereupon the names of Dr. J. N. Hall and Dr. Wm. P. Munn were placed in nomination and duly elected, the Secretary being instructed to cast the ballot of the Society for their election.

Dr. J. L. Fierstone, of Ft. Morgan, being absent from this session, his paper entitled "Intestinal Antisepsis" was read by title.

Dr. J. N. Hall, of Denver, followed with a paper entitled "Association of Appendicitis and Typhoid Fever." Discussed by Drs. W. W. Grant and J. N. Hall.

Dr. E. Stuver, of Rawlins, Wyoming, read a paper entitled "The Relation of the Physician to Social, Educational and Moral Questions." A discussion followed by Drs. Axtell, Pershing, W. J. Rothwell and E. Stuver.

Dr. J. Tracy Melvin, of Saguache, followed with a paper on "Broncho-Pneumonia in Children." No discussion.

Dr. A. M. Holmes, of Denver, presented a paper entitled "The Diagnosis of Tuberculosis from the Morphology of the Blood; An Original Research." On motion of Dr. W. E. Wilson, the doctor was permitted to finish reading his paper.

Dr. Munn then made a motion, saying: "Inasmuch as the session is a long one, and it is practically impossible to reach the end of it during the time allotted to this session, I move you that it be the sense of this Society that there be no further discussion of papers this afternoon, and that motions to extend the time set for papers be declared out of order. We have at present six other papers, and while I know that it is not desirable to cut off discussion, still it is necessary to enforce the rule as to time for the reading of papers to do justice to those who have come here with papers prepared and are placed at the end of the programme."

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Dr. W. W. Grant—"I would like to ask if it is intended to cut off all discussion on this paper of Dr. Holmes, which is one of the most valuable papers that has been read to the Society."

Dr. W. P. Munn—"I do not mean that at all. I mean that this session is short of time; that there are members waiting who should be allowed to read their papers, and in order that they may do so no further extension of time should be granted. There are gentlemen here who have come a long distance with papers prepared for the Society. Of course I do not mean to cut off the discussion on Dr. Holmes' paper."

The motion being put to a rising vote, same was carried.

Dr. Chas. Denison, of Denver, read a paper entitled "The Reaction to Tuberculin verified by Blood Changes hitherto unrecognized." Drs. Grant and Chas. Powers were requested by Dr. Denison to examine a patient in an adjoining room.

An address by Dr. Bond Stowe, of Glenwood Springs, on "A New Remedy for the Alleviation of Phthisis" was not delivered owing to the doctor's absence from this session.

Dr. J. W. Exline presented a paper entitled "Sanitation of Mines."

Meeting adjourned at 6:15 p. m.

TUESDAY EVENING.

The members and friends of the Society were invited to meet at 8 p. m. in the ordinary of the Brown hotel to witness an exhibition of "Roentgen Rays" and listen to subsequent discussions. The interest manifested in the subject was evidenced by the large number present. A paper on the "X Ray," prepared by Mr. Chas. F. Lacombe, an electrician of Denver, was read by Dr. E. P. Hershey. The doctor very successfully demonstrated the methods used with the skiographs and numerous photographs of fractures, etc., were thrown upon the screen. The subject was discussed by Drs. E. J. A. Rogers, Leonard Freeman, Geo. W. Miel, of Denver, and P. J. McHugh, of Fort Collins. After the close of this informal gathering, those present were invited to a Dutch lunch served in the club room.

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WEDNESDAY, JUNE 17, 1896.

MORNING SESSION, 9 A. M.

The meeting was called to order at the appointed time by the President.

Dr. W. E. Wilson made a motion, prefaced by the following remarks:

"I have a suggestion to make which is that, that it would be doing an injustice to those on the programme this morning to go back and recall the names of those whom we were unable to reach yesterday. Persons expected to read papers this morning will be here for that purpose sooner or later, and as some have come from a distance, I think it proper to give them the preference. In order to facilitate matters I move that the papers on the morning's programme be called for first and read without discussion so that we may 'catch up' and have an opportunity of recalling those papers on yesterday's programme whose authors were absent from inevitable causes." Motion seconded.

Dr. Frank Finney amended above motion to limit discussion to five minutes. Same seconded. Amended motion was put and carried.

Dr. E. C. Rivers made a motion to the effect that no paper shall be permitted to be read before this Society that has been read before any other society previous to this, or that has been published in any journal or transactions of societies prior to this. Dr. Rivers called attention to the fact that a paper on the programme bearing the same title had been presented by the same author at another society prior to this. Motion seconded and carried.

Dr. Foster—"I would like to call the Society's attention to the paper referred to by Dr. Rivers. I questioned the author of said paper with reference to this, and he replied that it had been put on the programme of the local society by mistake, but not read."

Dr. Rivers—"I did not mean to be understood as saying that I had heard the paper read. I know a man who read a paper here which he had read to two different societies

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before presenting it to us, we receiving it at its third reading and publishing it in our Transactions, when it had already been published the previous year and read before two other societies."

Dr. Munn—"If no motion has been adopted with regard to the order of business for Thursday afternoon, I desire to move that on that afternoon, if the programme as arranged shall not have been finished by 4 o'clock, all other business shall cease at that hour and the address of the President be the order of business. I make this motion, Mr. President, because occasionally the address of the President, which is the real matter of importance for Thursday afternoon, and preceding as it does the election of officers, has been delayed until a late hour by prolonged discussions on papers during the last afternoon of our meeting. I think we might very reasonably give the President's address the place of honor at that time. This explains my reason for making the motion." Motion seconded.

The President—"This motion being a change in the order of business, it will require a vote of two-thirds to carry."

Dr. J. N. Foster amended Dr. Munn's motion to the effect that the President be empowered to control discussions so that all papers may be reached by 4 o'clock on Thursday, thus giving each man his pro rata of time. Motion as amended was duly seconded and unanimously carried.

Reports of committees being called for, Dr. Munn responded as follows:

The Committee of Fifteen was called together several times to consider the subject allotted to it, but it was impossible to at any time secure a quorum. As there was a manifest lack of interest it was not thought advisable to bring the matter further before the Society until it should be convinced that some action is necessary. The Committee of Fifteen, therefore, reports no progress, and asks to be discharged.

The President—"This Committee of Fifteen was appointed last year upon the suggestion of the retiring President for the purpose of having national sanatoria established in Colorado."

On motion of Dr. Foster, the report was received and the committee discharged.

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The first paper of the morning was read by Dr. Frank Finney, of La Junta, entitled "Reports of Seven Consecutive Cases of Appendicitis." Dr. Wm. P. Munn opened the discussion, which was closed by Dr. Finney.

A paper entitled "Report of Surgical Cases," by Dr. A. S. Lobingier, of Denver, was read by title.

The paper of Dr. E. A. Lee, of Fort Collins, entitled "Operation for Fibro-Cystic Tumor," was read by title.

Dr. Chas. A. Powers, of Denver, then presented a paper on his "Work of the Year in Appendicitis."

Dr. C. B. Lyman, of Denver, followed with an "Exhibition of a Simple and Effective Telephone Bullet Probe." Discussed by Dr. Geo. W. Miel.

Dr. C. B. Lyman then presented his paper entitled "Gastrotomy for Foreign Growth, with Report of a Case." The subject was discussed by Drs. H. G. Wetherill and Chas. A. Powers.

Dr. E. P. Hershey, of Denver, read a paper entitled "Treatcent of Sacculated Innominate Aneurism by Introduction of Gold Wire and Electrolysis." Discussion followed by Drs. W. W. Grant, Leonard Freeman and E. P. Hershey.

"Reports of Surgical Cases" followed, by Dr. Edmund J. A. Rogers, of Denver. The discussion was participated in by Drs. H. G. Wetherill, W. W. Grant, Chas. S. Elder, Geo. W. Miel. Dr. Rogers closed the discussion.

Dr. Chas. A. Powers inquired of the Chair if the paper of Dr. Holmes had been discussed or whether it had been postponed.

The President—"There has been no discussion of that paper."

Dr. Powers—"The paper of Dr. Holmes, it seems to me, is a very interesting one, embodying, as it does, many months of work and original research, and setting forth theories which are certainly novel and very remarkable. If it be corroborated it will certainly mark a great advance in medical science. I think, sir, that the discussion of that paper is worthy of especial place, and in order that some of the men who heard it yesterday and are present to-day may discuss it, I move you that it be made a special order of business for to-morrow

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morning, at such hour as the President may appoint, preferably at 11 or 11:30 o'clock, that Dr. Holmes may be present and Dr. Crouch and such men as I know who would be very glad to discuss it."

Motion seconded and carried.

The President thereupon announced that the discussion of said paper would take place to-morrow at 11 a. m.

Dr. E. C. Rivers, of Denver, read his article which appeared on yesterday's programme, entitled "Case of Sympathetic Ophthalmia." The paper was referred to the Publication Committee without discussion.

Dr. B. A. Arbogast, of Breckenridge, followed with a paper, also on yesterday's programme, entitled "Have We New Diseases, or is our Profession Drifting to Quackery?" Discussed by Drs. Wetherill, Wilbur and Grant.

A paper by Dr. S. T. McDermith, of Denver, on the subject of "Medical Insurance and the Inter-Relations of the Examiner, Applicant and Insurance Body," was read by title.

"Late Improvements in the Binaural Stethoscope" was the title of a paper presented by Dr. Chas. Denison, of Denver, with exhibition of the instrument.

Dr. Geo. W. Miel made a motion that Dr. J. C. McClintock, of Topeka, Kansas, be invited to take part in the discussions.

Motion duly seconded and carried.

A motion to adjourn was put and carried.

Meeting adjourned at 12 m.

AFTERNOON SESSION.

Meeting was called to order at 2 p. m. President I. B. Perkins in the chair.

The principal feature of the afternoon's programme consisted of a symposium on "Intestinal Obstruction," participated in by eight members. Dr. O. J. Pfeiffer, of Denver, opened the subject with a discussion on "Forms and Causes of Intestinal Obstruction." Dr. F. H. McNaught, of Denver, followed with an address on the same phase of the subject.

At this juncture the report of the Committee on Finance was submitted by Dr. Robt. F. LeMond, who stated that the

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Treasurer's books had been examined by said committee and had been found correct in every particular. On motion, the report of Finance Committee was accepted.

Next in order of the afternoon's programme was the third discussion of the symposium, by Dr. S. G. Bonney, of Denver, who addressed the Society on the subject of "Intestinal Obstruction in Children."

Dr. H. T. Pershing announced in behalf of the Executive Committee that every member and visitor is cordially invited to attend the banquet on Thursday evening, non-resident members being considered as guests.

Dr. John M. Foster moved that in conformity to the resolution passed at the last year's meeting of this Society, a committee of seven members be elected by vote of the Society, to constitute the Nominating Committee, no more than two of whom shall be from any one county; which committee shall present to the Society the names of members to be elected as officers of the Society for the coming year, as follows: Not less than three candidates for the office of President, three candidates for the office of Corresponding Secretary, three candidates for the office of Recording Secretary, and as many as such committee desires for all other offices. The action of such committee, however, shall not prevent the nomination of any other member for any one of the offices. The candidates, as recommended, to be be voted by an informal or formal ballot as has been customary. Motion duly seconded and carried.

Thereupon the following names were placed in nomination to comprise such Nominating Committee: Dr. W. P. Munn, Dr. Hubert Work, Dr. J. M. Foster, Dr. H. R. Bull, Dr. P. F. Gildea, Dr. H. H. Bucknum, Dr. Frank Finney and Dr. F. N. Cochems.

On motion, the nominations were closed.

Dr. H. H. Bucknum withdrew his name, and on motion, the Secretary was instructed to cast the ballot for the remaining six nominees.

Dr. E. R. Axtell called the attention of the Society to the physicians' register at the rear door of hall, and also stated that members desirous of attending the banquet could procure their tickets from him.

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Dr. Hubert Work, of Pueblo, being absent, the next discussion on the symposium was conducted by Dr. H. W. McLauthlin, of Denver, the subject being "Medical Management of Intestinal Obstruction."

Dr. H. R. Bull, of Grand Junction, read a paper on the same subject.

Dr. Chas. A. Powers, of Denver, treated the subject under the caption "In What Class of Cases and at What Time Should Surgical Interference be Considered?" Dr. W. W. Grant, of Denver, spoke at some length on the same subject.

In the absence of Dr. J. W. O'Connor, of Denver, the "Surgical Management" was left solely to Dr. F. N. Cochems, who read a paper under the above title.

Dr. Foster then introduced to the Society, Dr. Bond Stowe, of Glenwood Springs, Colorado. The doctor spoke briefly of the spas of the old world, of which he had personal knowledge, and then dwelt upon the nature of the water of our own Glenwood. The doctor concluded his remarks by extending a most cordial invitation to the members and their wives to visit said springs on a free excursion provided for by The Glenwood Springs Improvement Company, which he represented. Arrangements had already been made to leave Denver on the morrow following the close of the session. The applause which greeted the doctor's remarks gave abundant proof of the appreciation with which the invitation was received.

The general discussion on the symposium was now opened by Dr. Frank Finney, who was followed by Dr. McClintock, of Topeka, and Dr. Cochems.

The President then gave all an opportunity to read papers who had been passed over during their enforced absence from meetings.

Dr. F. E. Waxham, of Denver, was then called upon to read his paper entitled "Report of 500 Cases of Intubation of Larynx." The paper was received and discussed by Drs. Chas. Denison, Bond Stowe, H. R. Bull and F. E. Waxham.

It was moved and seconded that Dr. W. W. Grant, of Denver, be permitted to read his paper at this hour instead of tomorrow morning as per programme. Dr. Grant then presented

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a paper entitled "Radical Operation for Inguinal Hernia." Dr. Frank Finney opened the discussion, which was closed by Dr. Grant.

The Chair announced that Dr. Chas. A. Powers would hold a surgical clinic at 12:30 to-morrow at the Arapahoe County hospital.

The Executive Committee called attention to this evening's reception tendered the members and friends of the Society by President and Mrs. Perkins at their residence, No. 132 West Fourth avenue.

Meeting adjourned at 5:10 p. m.

THURSDAY, JUNE 18, 1896.

MORNING SESSION.

Meeting called to order at 9:15 a. m. by the President.

Dr. Munn announced that since Dr. Work was not in attendance upon the meetings, another name should be suggested on the Nominating Committee. Dr. Munn then moved that Dr. E. Stuver fill the vacancy. Seconded by Dr. Foster.

The day's programme opened with a paper on "Bicycle Hernia," by Dr. Geo. W. Miel, of Denver. Discussed by Drs. S. D. Van Meter, Leonard Freeman, Geo. W. Miel.

Dr. Gildea made some announcements in behalf of the Membership Committee.

Dr. S. D. Van Meter, of Denver, read an article entitled "An Instructive Accident." Discussed by Drs. Freeman, Munn and Robinson.

Dr. Wm. P. Munn, of Denver, presented a paper entitled "A Rapid Method of Castration." Discussed by Drs. Wetherill and Munn.

Dr. Leonard Freeman, of Denver, read a paper on "Treatment of Chronic Inflammation of the Bladder, with report of two cases of Congenital Diverticula." The paper was discussed by Drs. Chas. A. Powers and Freeman.

Dr. H. G. Wetherill, of Denver, followed with a paper entitled "Gynaecology; Careful Case-Recording as a factor in

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Exact Diagnosis and an Aid to Rational Treatment," with exhibition of charts for same. No discussion.

The paper of Dr. W. A. Jayne, of Denver, entitled "The Management of Puerperal Sepsis," was read by title.

A paper by Dr. A. A. Clough, of Denver, on "Morbid Uterine Reflexes," was also read by title.

Dr. T. M. Burns, of Denver, read a paper on the subject of "Symphysiotomy," illustrated by means of a skeleton pelvis. No discussion.

The morning's programme having been completed, the Society returned to the unfinished business of yesterday.

Dr. W. W. Grant opened the discussion on Dr. Holmes' paper. Others participating were Drs. Denison, Stuver and Holmes.

Dr. Denison moved that the Committee of Award formed last year to confer a prize of $100 upon the author of the best essay on "Diagnosis of Tuberculosis by Microscopical Examination of the Blood" be enlarged and that Drs. Chas. Powers and E. R. Axtell be added for another year. Motion seconded by Dr. Grant and carried.

Dr. H. G. Wetherill, of Denver, read a paper entitled "Supernumerary Oviducts and Typical Hydatid of Morgagni with a Large Fibroid Uterine Tumor—'Hysterectomy.'" The doctor exhibited the specimen, also photographs of same.

Dr. Foster made some announcements in behalf of Executive Committee.

Dr. Pershing again called the attention of non-resident members to to-night's banquet at the Brown Palace hotel.

Dr. J. T. Eskridge announced that the second Pan-American Medical Congress would meet in the city of Mexico early in November; that special railroad rates had been secured; that names of all desiring to read papers must be submitted by August 1. The doctor made an urgent appeal for a good representation from Colorado, and stated that nine had already signified their intention of going, eight of whom would be readers of papers.

Dr. B. Hyrup-Pedersen, of Denver, exhibited an improved Sims' speculum, devised by himself.

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It was moved and seconded that Dr. Stover be permitted to read his paper at this hour instead of in the afternoon as per programme.

Dr. G. H. Stover, of Eaton, then presented the paper, entitled "Two Cases of Cutaneous Vaso-motor Neurosis, with Speculations Thereon." The paper was received and discussed by Drs. Pershing, J. T. Eskridge and G. H. Stover.

The Chair announced that names for membership must be handed to Dr. Gildea at once.

Meeting adjourned at 11:50 a. m.

AFTERNOON SESSION.

The Society convened in the hotel ball room at 2:30 o'clock, and was called to order by the President.

Dr. J. T. Eskridge, of Denver, read the first paper on the afternoon's programme, entitled "The Diagnosis of Tumor of the Brain." Discussion followed by Drs. Pershing and Eskridge.

Dr. J. N. Hall, of Denver, announced that he had a rare case of heart disease in an adjoining room for the examination of any members present who were interested, the case being one of mitral regurgitation described by Griffith, in which the murmur occurs near the end of the cystole instead of at the beginning as is usual. Dr. Hall stated that medical literature records but five or six similar cases.

Dr. H. T. Pershing, of Denver, read a paper on the subject of "Diagnosis of Headaches." Discussed by Drs. Eskridge and Pershing.

A paper entitled "Early Diagnosis of Pott's Disease, Together with Some Remarks on Principles of Treatment," by Prof. John Ridlon, of Chicago, was read by title.

A paper on "Colorado's Feeble-Minded Children," by Dr. Hubert Work, of Pueblo, was also read by title.

Dr. Clayton Parkhill, of Denver, presented a paper entitled "A New Apparatus for Maintaining Apposition of Bones after Resection, or in Fractures with Tendency to Displacement." The apparatus was exhibited and the subject discussed by Dr. Hugo Mager, of Denver.

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The hour having arrived for the customary annual address, Vice President Dr. A. J. Robinson was called to the chair and announced as the next order of business the reading of the President's address, which was received with marked attention and appreciation.

Dr. Bond Stowe made further explanations regarding the prospective excursion, saying that the number of applicants for tickets had exceeded his most sanguine expectations and that the accommodations must necessarily be limited to 160. After a spirited consultation about twenty-five members withdrew their names and the suspense following the doctor's announcement was relieved.

There still being some time at the Society's disposal, it was moved and seconded that all papers not yet read be given a hearing at this hour.

The reports of committees again being called for, Dr. Gildea responded in behalf of the Membership Committee, saying that this committee had reported favorably upon the names on the printed list already distributed. The Society then proceeded to ballot for the election of new members. The Chair appointed Drs. Sheets, Black and Holmes as tellers.

The following members were duly elected to full membership:

R. L. McCreery, Colo. Springs.
F. B. Ambler, Denver.
Fred N. S. Ames.
Una G. Roberts, Denver.
M. McNeelan, Basalt.
L. H. Kemble, Aspen.
R. B. Freeman, Denver.
Alfred Mann, Denver.
P. Hyrup-Pedersen, Denver.
A. J. O. Lof, Montclair.
C. D. Spivak, Denver.
H. W. Rover, Denver.
Bond Stowe, Glenw'd Sp'gs.
H. G. Wetherill, Denver.
A. M. MacLean, Leadville.
M. T. C. Love, Denver.
Arthur Bonesteel, Cen'l City.
W. T. Little, Canon City.
J. T. Muir, Lake City.
Benj. F. Griffith, Leadville.
J. A. Jeannotte, Leadville.
Chas. B. Nichols, Denver.
H. F. Hazlitt, Pueblo.
W. A. Kickland, Ft. Collins.
S. W. Jacobs, Denver.
Jno. Gould, Grand Junction.
Sard Weist, Longmont.
G. N. Macomber, Denver.
Saling Simon, Denver.
C. P. Steeves, Littleton.
G. W. Burleigh, Boulder.
D. A. McLean, Ft. Collins.

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Wm. W. Ashley, Ouray.
F. B. Bull, Denver.
H. R. Burns, Louisville.
Samuel Bell, Denver.
D. K. Lucy, Denver.
Geo. Hamilton, La Jara.
A. S. Taussig, Denver.
S. G. Mugrage, Denver.
John Law, Leadville.
Z. B. Malaby, Cripple Creek.
E. W. Kearby, Rocky Ford.
A. J. Osterman, Denver.
Chas. W. Thorp, Denver.
R. L. Thorp, Denver.
H. G. Rose, Denver.
A. L. Craig, Denver.

Dr. W. P. Munn, chairman of Nominating Committee, submitted the following report:

According to instructions, we were to select the names of not less than three candidates for President. We desire to present the following named gentlemen for the office: Dr. Robt. Levy, of Denver; Dr. Clayton Parkhill, of Denver; Dr. E. C. Rivers, of Denver; Dr. Chas. Denison, of Denver.

For the office of First Vice President: Dr. H. R. Bull, of Grand Junction.

For Second Vice President: Dr. Frank Finney, of La Junta.

For Third Vice President: Dr. S. D. Van Meter, of Denver.

For Corresponding Secretary: Dr. E. R. Axtell, Dr. H. B. Whitney, Dr. Geo. W. Miel, all of Denver.

For Recording Secretary: Dr. Laura L. Liebhardt, Dr. Howell T. Pershing, Dr. J. M. Blaine, all of Denver.

For Assistant Recording Secretary: Dr. H. H. Bucknum, of Denver.

For Treasurer: Dr. W. F. McClelland, of Denver.

Board of Trustees: Dr. Jacob Reed, Colorado Springs; Dr. Hubert Work, Pueblo; Dr. Sam'l A. Fisk, Denver; Dr. W. R. Whitehead, Denver; Dr. A. Stedman, Denver; Dr. W. E. Wilson, Denver; Dr. L. E. Lemen, Denver.

Members of Committee on Admission: Dr. T. A. Hughes, Denver; Dr. S. D. Hopkins, Denver; Dr. E. Stuver, Rawlins, Wyoming; Dr. W. W. Bulette, Pueblo.

Dr. Wilson moved that we proceed to vote for the new officers. Carried. The former tellers were retained.

Drs. Denison, Parkhill and Rivers withdrew their names.

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On motion of Dr. E. P. Hershey, the Secretary was authorized to cast the vote of the Society for Dr. Robt. Levy for President. Drs. Parkhill and Denison were appointed to conduct the President-elect to the chair, who acknowledged the honor and gave the following brief address:

Mr. President and Members of the Colorado State Medical Society—You will, I know, pardon me for saying but a few words on this occasion. I feel that no one can be insensible to the great honor that has been so generously bestowed upon me, and assure you that I have a feeling of profound gratitude. I confess that I did not prepare a speech anticipating my election, although I had ambitions and hopes in that direction, for I, of course, will not deny that I knew my name was being used. I felt, however, that if I prepared a long speech anticipating an election it might be in the nature of "counting chickens before they are hatched," consequently I assure you I have nothing to say, with the exception of the expression of my sincere thanks. One word in addition. It shall be my endeavor to do my fullest duty to the Colorado State Medical Society. I believe that my election has been upon the grounds of a member of the Colorado State Medical Society, and it shall be my endeavor to follow along the lines that have been suggested by your unanimous election. I thank you.

The above speech was followed by prolonged applause.

On motion of Dr. Pershing, the Secretary was instructed to cast the ballot of this Society for all single nominations, including committees. The officers thus elected were: First Vice President, Dr. H. R. Bull, Grand Junction; Second Vice President, Dr. Frank Finney, La Junta; Third Vice President, Dr. S. D. Van Meter, Denver; Assistant Recording Secretary, Dr. H. H. Bucknum, Denver; Treasurer, Dr. W. F. McClelland, Denver.

Dr. Geo. W. Miel withdrew his name as candidate for the office of Corresponding Secretary, and while the balloting was progressing, reports of committees were called for.

The Committee on Sanitation and Preventive Medicine stated that nothing of interest had transpired. The Committee on Medical Ethics likewise had no report.

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Dr. Pershing moved that the usual annual assessment of $5 be levied on each member for the forthcoming year. Motion carried.

On motion it was adopted that all papers on this programme be referred to the Publication Committee.

Dr. W. P. Munn—"I presume all members of the Society are aware that there is pending in congress a bill restricting vivisection in medical colleges, and a suggestion has been made that all authorized bodies shall attempt to influence their congressmen and senators in opposing this bill. While it is true that the bill applies only to the District of Columbia, it is also true that it will be an entering wedge for the introduction of such legislation in every state in the Union. It has already been begun in the state of Massachusetts. In order that this Society may be placed on record in this matter, I move that a committee of three shall be appointed in behalf of this Society by the incoming President, and that Dr. Chas. Denison be appointed chairman of that committee, to prepare a memorial to the Colorado senators and representatives, asking them to oppose any measure for the restriction of vivisection in the instructing courses of medical colleges."

Motion seconded and carried.

The result of the balloting for Corresponding Secretary was then announced, the Chair stating that Dr. H. B. Whitney, of Denver, had been duly elected.

The Recording Secretary, Dr. Laura L. Liebhardt, thanked the Nominating Committee for the courtesy shown in considering her name for a second term, but declined the honor with thanks.

Drs. H. T. Pershing and J. M. Blaine also arose to decline the nomination, the latter moving that the acting President be instructed to cast the vote of the Society for Dr. Liebhardt for Recording Secretary. Motion seconded by Dr. W. E. Wilson and unanimously carried.

Dr. Chas. Denison—"I would like to second the motion made by the President in his address with reference to the medical schools, and recommend that a vote be taken on the question of consolidating the local medical colleges. I move you that in the opinion of this Society it is desirable that the

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medical colleges of the regular school, that are represented in Denver, should be consolidated into one college."

This motion being put to a rising vote, the same was unanimously carried.

Dr. W. A. Campbell, of Colorado Springs, moved that the incoming President request each of the three colleges in Denver to appoint one man upon the Committee of Five referred to in the President's address, and that the three so chosen have the power to select two others to consult with them as to the best method of consolidation. Motion seconded and carried.

Dr. J. M. Foster moved that the hearty and sincere thanks of the Society be tendered the Brown hotel managers for their generous treatment of the Society in giving it the use of its rooms and in other ways adding to the comfort of the Society. Unanimously carried.

On motion of Dr. W. E. Wilson, it was unanimously carried that the thanks of this Society be extended the outgoing officers for their assiduity and persistency in their efforts to make this meeting a success. Carried.

Dr. W. P. Munn offered the following resolution:

"*Resolved*, That a special vote of thanks be tendered to Dr. J. M. Foster, to whose personal effort much of the comfort, welfare and prosperity of this meeting was due."

Unanimously carried.

Dr. E. R. Axtell called the attention of the new members to the Constitution to be signed.

A motion was made and seconded that the Twenty-Sixth Annual Session of the Colorado State Medical Society stand adjourned to meet again in Denver in June, 1897.

LAURA L. LIEBHARDT, M. D.,
Recording Secretary.

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Glenwood Springs, June 20, 1896.

At an informal meeting of the members who participated in the excursion to Glenwood Springs, the following resolutions were unanimously adopted:

There are times when human appreciation of favors bestowed cannot be expressed in words; yet, since words must be used, we desire to extend to the Glenwood Springs Company this feeble expression of our gratitude for the most delightful trip and entertainment that the 175 members of this gathering have ever been permitted to enjoy.

Such splendid hospitality could only be conceived in the minds of large hearted, magnanimous and generous men.

Glenwood Springs is a surprise. Its natural advantages are beyond our highest expectations. It is our honest conviction that it is equalled by no other health resort in America, and it will be the pleasant duty of the physicians of this body to do all in their power to make it the health resort of the world.

P. J. McHUGH,
I. B. PERKINS,
J. A. WHITING,
THOMAS H. HAWKINS,
E. R. AXTELL,
Committee.

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President's Address.

Ladies and Gentlemen:

We are now about to close another successful year of our existence as a medical society—the first year of the second quarter of a century. The vigorous infant, born of noble parentage in 1871, may now justly be called an adult; one competent to take the lead in all matters pertaining to the health of the public and the welfare of the profession in our state. This has been clearly shown by the number as well as the scientific character of the papers read during this session.

I regret exceedingly that some faces familiar to us in past years are not with us to-day, they having answered the summons calling them to the unseen shores to which we must all soon go. Long may their good work live, and we be benefited by remembering their noble and unselfish deeds. I am thankful that in the large number taken from us by death in the past year, none of those spoken of by us as our "Fathers in the profession," have been numbered. May they live long among us—an inspiration to the younger men in our ranks.

The most startling scientific discovery of years, and one that will be of incalculable benefit to us as physicians and surgeons, is that of Prof. William Conrad Roentgen, given to the public about six months ago. At first the report that a photograph or correct picture of the skeleton could be taken through the soft tissues of the body, a bullet or foreign body in the flesh accurately located, and all this with splints and dressings intervening, was thought by many to be only the vision of a scientific dreamer. But in a few weeks, successful experiments in almost every city of the world demonstrated the truth of the reported discovery, and the name of Roentgen was immortalized. Other scientists, using the knowledge

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given them by Prof. Roentgen, were able to add still more to the list of wonders connected with this new discovery. And now we are prepared to predict great revelations through it in the near future, as I believe it to be only the alphabet of what will soon follow. When we are able by the X rays to detect the difference between the normal and the pathological tissue in the soft parts, as well as in the bony structures, the Roentgen rays will supplant the exploratory incision and relieve us from performing many dangerous operations which have been thought unavoidably necessary in the past. If, also, the rays are found to be destructive to germ life, the whole treatment of medicine will be changed. It is gratifying to us that in our own city and society we have men who are fast coming to the front in this new departure in science, as has been so ably shown us this week by Messrs. Lacombe, Haffner, Johnson, and our own Dr. Hershey.

Investigation has not been confined alone to electricity. In bacteriology many investigators have been searching on a scientific basis for truth in diagnosis, and for remedial agents such as were accidentally discovered by Jenner and used by scientific men for a century without their being able to give any scientific reason for their action. The discovery by Koch, while a failure as a remedy for tuberculosis, served as an impetus to investigation which has since been rewarded by the discovery of other remedies.

Antitoxin, while in use to some extent in this country, before our last meeting, had not been subjected to the crucial test of criticism which in the past decade has relegated so many supposedly useful discoveries to the background, or to common places along with other ordinary remedies. Although this remedy has by no means been universally adopted by the profession, it has been given a fair trial by many, and with most gratifying results, as it appears to be a specific in properly selected cases.

Several new remedies with great promise have recently been offered us for tuberculosis, and some of them during the past year. But these are too new for us at this time to judge of their real worth. I have no doubt that some of them will

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prove valuable, but I fear they will not be specifics in any sense. I would urge members of this society to push investigation on this subject, as nowhere else in the United States, if, indeed, in the world, are the same favorable conditions auxiliary to the treatment of this trouble to be found as in Colorado. Here I wish to compliment Dr. Holmes on his paper read before you on the diagnosis of tuberculosis by examination of the blood, and to ask him to continue his work on that line; for what we want, is a method of diagnosis that will enable us to detect the disease in its very beginning, when treatment will be more efficacious.

In this connection I wish to express my regrets that the committee of fifteen, which was appointed in accordance with the recommendation of our retiring president last year, for the purpose of trying to get a national sanitarium established in Colorado, have not been able to make a more favorable report. However long it may take to accomplish the result, I would recommend that a good committee from this society be kept at work on the problem until success shall crown their efforts, and that they work directly through our representatives in congress, through our state medical societies, through the American Medical Association, the American Public Health Association, and the American Climatological Association, and see if the government at Washington cannot be induced to put within reach of its half million sufferers from this dread disease, dry air and elevation—the best known remedy at the present time for this malady, which annually takes away many of our best citizens, a number almost equal to the population of this city. It is our duty to advertise the efficiency of this climate in these cases; also, to educate the public against carelessness in spreading the trouble, and to educate our Eastern brethren with reference to the proper time in the progress of the disease to send patients here in order that the best results may be obtained.

It must be gratifying to this society to see medical schools lengthening their required course of study. This is a step in the right direction; but I believe it would be a benefit to all concerned if the course of study were still further lengthened,

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and if the education required prior to entering the medical school were made to cover several branches usually taught in the medical course, such as biology, chemistry and bacteriology. This would give more time for the study of general medicine, and more opportunity for clinical work at the bedside—and this appears to be one of the greatest needs of our schools at the present time.

I think the profession now needs more specialists, but they should take general medicine as their specialty. I realize that the whole subject of medicine is too vast for one to be expert in all branches of it; so is any specialty too narrow for a broad-minded man, unless he is fairly well informed in all branches, and has grown up into his specialty through years of general work. Specialists are made by a process of evolution which should cover years of general practice and develop special skill and knowledge in the branch selected, and not be by exclusion, which may be done by a beginner with very little practical knowledge in any branch, and often with less skill than knowledge.

I believe I express the desire of the majority of the members of this society when I say that the best interests of the profession in our state demand a union of the three regular schools of medicine now existing in this city. By this union we would have one strong school which we could all heartily support—an institution to which we could point with pride, and from which better qualified practitioners would result than is possible under the existing conditions. How to bring about this much desired result is a question difficult of solution. The report last year of the committee to whom was referred the matter of trying to consolidate the three Denver schools did considerable work, and this year we have no report from them at all. I would recommend that the voice of this society be taken here to-day as to whether or not such a union is desired. If the vote be in the affirmative—which I believe would be the case—then I would recommend the reappointment of our committee, and have them, after consulting the dean, in each school, call a meeting of the three faculties, or committees representing them, and see if the schools cannot

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be consolidated during the coming year. The selection of a faculty for the new school would certainly be an easy matter, as all the teachers now employed in the three schools could be given positions in the new organization. It is certain that all could not be professors; but an adjunct or lecturer in the new school would hold a more honorable position than a professorship in either of the three schools as they now exist. If this union can be brought about, it will do much to destroy the factions now existing among us, though I must say that these factional lines are not so marked as they were a few years ago. And in a profession like ours, the most noble of all the professions, in which such a large proportion of noble characters are found, who toil day and night for the relief of the suffering, and often with no remuneration except the consciousness of duty done, why should we quarrel among ourselves and say unkind things about each other? The greatest among us, taken singly, and made to depend upon himself alone, would amount to nothing.

The standing of the profession in the state will depend upon the estimate physicians themselves put upon it, as by our treatment of each other in our individual lives we educate the public as to our real worth. Let us pay more attention to the unwritten code of ethics than is our usual habit; let us be broad-minded; let us be charitable; let us be just.

"Is it worth while that we jostle a brother,
Bearing his load on the rough road of life,
Is it worth while that we jeer at each other,
In blackness of heart that we war to the knife?
God pity us all in our p....ul strife.

"God pity us all as we jostle each other,
God pardon us all for the triumph we feel
When a fellow goes down 'neath his load on the heather,
Pierced to the heart; words are keener than steel
And mightier far for woe or for weal.

"Were it not well in this brief little journey,
On over the isthmus, down into the tide,
We give him a fish instead of a serpent,
Ere folding his hands to be and abide
Forever and aye in the dust at his side?

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"Look at the roses saluting each other,
Look at the herds all at peace on the plain;
Man, and man only, makes war on his brother
And laughs in his heart at his peril and pain,
Shamed by the beasts that go down on the plain.

"Is it worth while that we battle to humble
Some poor fellow soldier into the dust?
God pity us all. Time oft soon will tumble
All of us together like leaves in a gust,
Humbled indeed down into the dust."

A FEW HINTS ON THE USE OF THE TUNING FORK IN EAR DIAGNOSIS.

G. MELVILLE BLACK, M. D., DENVER, COLO.

Inasmuch as intelligent treatment in almost all pathological conditions is dependent upon a positive diagnosis, an accurate knowledge of the nature of the disease, its intensity, and its location, becomes essential.

There is probably no part of the body that gives more positive signs of disease, and yet where the latter is more difficult of classification as to its character and exact location, than the ear. For example: Disease of the external ear and auditory canal is apparent enough; yet here, because of an occlusion of the canal by the pathological process, doubt may exist for some days as to how far it extends. But it is in differentiating between diseases of the tympanic cavity and the labyrinth that there is most confusion; and in order that we may establish the diagnosis on subjective symptoms it is necessary to call into use everything at our command.

Hartman's set of five forks, consisting of C, C^{I}, C^{ii}, C^{iii} and C^{iv}, with 256, 512, 1,024 and 2,048 vibrations to the second, for each fork respectively, when used in the following manner, give very positive results:

The length of time each fork is heard by each ear, when held vibrating close to the meatus, and the length of time each

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is heard with the handle pressed firmly against the mastoid, affords an accurate estimate of the aerial and bone conduction. This, in my opinion, is the greatest province of the tuning fork.

Rinne's and Weber's tests are both based on the principle of the relative proportion of aerial and bone conduction.

By timing the duration of aerial and bone conduction with a split second stop-watch, we eliminate the possibility of misleading answers on the part of the patient; for instance, by attempting to note whether aerial or bone conduction is increased, one over the other, it is a common thing for observers to set the fork in vibration and hold it close to the meatus, and the patient is instructed to note how loud it sounds; then the fork is again set in vibration, the handle pressed against the mastoid, and the patient instructed to compare the two tones, and state which sounds to him louder. Here we have to depend entirely upon the patient for a correct answer, which is often very hard for him to give, if aerial and bone conduction are about equal. Rinne's test is equally liable to error. Weber's test is inaccurate unless accompanied by other tests—e. g., the fork is set in vibration, the handle pressed against the front teeth or on the median portion of the frontal or parietal bones, and the patient instructed to note whether the sound is louder in either ear. Suppose he says it is heard more distinctly in the right ear—what does it signify? That he has either a normal or a diseased middle ear on the right side, or a disease of the internal ear or a normal ear on the left side. Consequently, other tests must be employed to locate the seat of the disease.

By simply timing in seconds the duration of aerial and bone conduction for each ear all other tests are embraced, and faulty answers of the patient eliminated.

The following table shows in seconds the time a normal ear should hear the various forks, by aerial and bone conduction. The fork marked C⁻ is Denche's, and has sixty-four vibrations to the second. The remaining forks are Hartman's, with the vibrations as before given.

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	Air.	Bone.
C–	10	9
C	37	15
C^{i}	32	18
C^{ii}	48	15
C^{iii}	30	10
C^{iv}	22	8

By this series of tests we establish at once whether or not the bone or aerial conduction is out of balance; for example, take the following case, with H. D. 1^{u} for 150^{u} watch:

	Air.	Bone.
C–	0	0
C	0	10
C^{i}	6	11
C^{ii}	10	9
C^{iii}	15	10
C^{iv}	13	6

It is to be seen at once that both aerial and bone conduction are lowered, but that the aerial conduction is more shortened than the bone conduction, showing an involvement of the middle and internal ears.

The following record shows the relation in chronic inflammation of the middle ear: Man, aged 50 years; duration, six months.

	Air.	Bone.
C–	7	9
C	7	25
C^{i}	16	20
C^{ii}	26	27
C^{iii}	18	16
C^{iv}	17	13

The next case is one of sclerosis of the middle ear, in a woman 35 years of age. The symptoms date back seven years.

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	Air.	Bone.
C^{-}	0	11
C	0	21
C^{i}	0	24
C^{ii}	12	23
C^{iii}	8	14
C^{iv}	14	14

It will be seen by comparing the last two cases with the table of normal aerial and bone conduction, that bone conduction is prolonged over the normal, and that aerial conduction is considerably shortened below the normal; which indicates faulty action on the part of the transmitting mechanism—i. e., that the disease is situated in the middle ears.

The following record is from the case of a woman, aged 57 years, with disease of the internal ear. Symptoms date back twenty years:

	Air.	Bone.
C^{-}	0	0
C	17	14
C^{i}	14	8
C^{ii}	14	3
C^{iii}	10	0
C^{iv}	7	0

It will be noticed in this case that both aerial and bone-conduction are shortened, but that the bone conduction is much more shortened than the aerial, which indicates a faulty sound-perceiving apparatus—i. e., a disease of the internal ear.

We have learned from post mortem examinations upon subjects upon whom careful examinations had been made of the state of the ears before death, that the labyrinth shows disease of the lower turns of its cochlea when perception of the higher tones has been altered, and that the upper turns of the cochlea are diseased when the lower tones have been altered. From these facts, we can, with the tuning forks, and Galton's whistle, locate the seat of labyrinthian disease with a fair degree of accuracy.

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In long standing disease of the middle ear, changes frequently take place in the lower turns of the cochlea, which is indicated by faulty perception of high tones.

My experience has been that *little can be expected from treatment, in chronic inflammation of the middle ear, when bone conduction is markedly lowered for the forks* C^{ii}, C^{iii}, C^{iv}. *A favorable prognosis can usually be given, when bone conduction for these forks is notably prolonged.* When the forks C^{-}, C, and C^{i} are only heard for a few seconds by bone conduction and aerial conduction, and the remaining forks are heard longer by air than by bone, we are justified in diagnosticating a circulatory disturbance of the labyrinth, which almost always first affects the organs of Corti in the beginning turns of the cochlea. It may be either hyperaemia or anaemia.

The tuning forks cannot be relied upon to make a diagnosis, but rather to assist in making it, together with the symptoms in the case, the appearance of the drum-head, and the condition of the Eustachian tubes. The alteration of the patient's voice I always consider important. In marked middle ear involvement alone, the patient speaks in an unusually low voice, with a nasal twang. In labyrinthian disease, the voice is loud and clear. This is due to the increase in bone conduction in the former case, and diminished bone conduction in the latter.

Vertigo is a symptom usually present in labyrinthian disease of an acute form, but is also frequently observed in middle ear disease, from pressure of the stapes in the oval window of the labyrinth, and from the diminished air pressure in the middle ear sucking the round window outward, thereby causing a disturbance in the pressure of the endo-lymph and paralymph, which, in turn, brings about circulatory disturbances. These attacks of vertigo, when due to the middle ear disease, are usually transient, and are largely to be accounted for in the aforesaid manner. I have benefited a number of cases by appropriate treatment, based upon a careful diagnosis, that I am satisfied would not have been helped had no pains been taken to discover the nature and location of the disease.

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Again, great care in diagnosis renders us capable of separating cases that cannot be benefited from those amenable to treatment. There is no satisfaction in encouraging a patient to undergo treatment, and after two or three months, discharging him unimproved, and much dissatisfied. How much better it would have been to have told him in the beginning, "I cannot help you;" or, "your case is beyond repair."

By a close study and persistent use of Hartman's series of tuning forks, you are sure to be pleased with the ease with which you are able to arrive at an accurate diagnosis and prognosis.

DISCUSSION.

Dr. P. F. Gildea—A man who pretends to make a diagnosis with a tuning fork must have given the subject a great deal of study, as it is not a simple matter; but one understanding it gets excellent results from its use. The work Dr. Black is doing, as shown by his excellent paper, is often neglected by many otologists, though all admit the value of it.

Dr. E. T. Boyd—For some time I have been using a series of tuning forks—Dench's fork, referred to by Dr. Black—with sixty-four double vibrations to the second. I find that the vibrations are felt rather than heard. In using Hartman's forks, I pay strict attention to what is termed the aero-osseal difference. For the purpose of arriving at the aero-osseal difference in a more accurate and expeditious manner, I use a split second, start, stop and fly-back watch. By a rough test with fork, I ascertain whether there is much impairment of either bone or air conduction, and I can then judge the number of seconds I may wait, after causing tuning fork to vibrate, before placing same to ear, and I thus avoid exhausting the sensibility of the auditory nerve so soon.

Supposing air conduction to be better than bone conduction in the case to be examined, I take the fork in one hand and watch in the other. I strike fork gently upon knee, and at the same time start both hands of watch. After fork has been vibrating for several seconds, I place stem of fork upon mastoid, and as soon as patient ceases to hear the tone, I split the second hands; then place fork in front of ear, and as soon

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as the patient shall have ceased to hear it by air conduction I stop the other second hand. My watch now gives me record of the length of time the fork used was heard by bone and air conduction; also, the aero-osseal difference—all of which I record in case book.

In making my diagnosis I place great dependence upon aero-osseal difference—noting whether it be increased, normal or diminished.

In arriving at the prognosis in uncomplicated middle ear trouble, Rinne's test is a good index. The more forks giving positive Rinne, the better the prognosis.

In the October issue of the Journal of Laryngology, Otology and Rhinology, for 1894, an instructive article on the aero-osseal difference in ear disease, written by Dundas Grant, can be found, and it was from the reading of this paper that I first got the idea.

Gentlemen, I thank you for your kind attention.

PURULENT MYRINGITIS IN CONNECTION WITH PULMONARY TUBERCULOSIS.

GEO. CLEARY, M. D., DENVER, COLO.

The profession in Colorado is intensely interested in anything pertaining to pulmonary diseases, since the state is one of the preëminently recognized Meccas for those unfortunates suffering from pulmonary tuberculosis. In consequence therefore, the members of the medical profession here find home opportunities for study and observation of phases of the disease which are denied those in various other localities. The typical ear affection which I shall describe presently is found, according to my experience, to co-exist with pulmonary tuberculosis, in every case I may say, with scarcely an exception. Its appearance is so characteristic, to me at all events, that I am vain enough to fancy that I can tell at sight, without any previous history or other examination, that the patient is a victim of the disease.

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I have time and again predicted lung trouble, when there were no outward physical signs of a general breaking down of the system, and without having been previously made aware of any lung complications, and have had those predictions verified afterwards, either by myself or others. In speaking of myringitis, you will necessarily have to bear in mind the close connection between it and otitis; but since this paper is meant to deal more particularly with myringitis, it does not attempt to enter into the various pathological processes of the middle ear, during the further progress of the disease.

Purulent myringitis in connection with pulmonary disease has been noted from a comparatively early period by an occasional observer, evidently more because of the peculiar symptoms and obstinacy of the affection, than the recognition of its gravity and importance. It is only in very recent years, in fact since the discovery by Koch of the tubercle bacillus, that it has claimed any special attention, and then only by a comparatively few earnest workers. I wish to make a small contribution, gathered from my own personal experience, hoping it may interest some of you.

Let us, in the first place, examine the characteristic differences between this ear affection and the ordinary form of acute otitis media perforativa, occurring from colds, or in connection with the exanthematous diseases. In the latter we are made aware of the violence of the inflammation by the rise of temperature, pain referable to the ear and side of the head, at times of great intensity, with accompanying deafness and tinnitus. If we now watch the membrane, we will notice changes taking place in it during the progress of the inflammation process. There is gradual congestion, pervading the periphery of the drum head, and along the manubrium; this soon extends over the whole surface, increasing in its intensity until it looks purplish. Then comes the bulging forward towards the meatus from the constantly increasing accumulation of secretion from behind. Perforation next takes place, with ragged, thick edges, giving vent to a sanious muco-purulent secretion. Then follows the gradual abate-

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ment of all the symptoms, the comparatively rapid closing of the aperture in the drum head, and finally the more or less complete restoration of the parts to their normal condition.

In the special form of otitis which occurs in connection with tubercular lung trouble, and which I believe I am justified in designating as of tubercular origin, a very different set of phenomena is presented, which at once arrests our attention and compels us to recognize the fact that we are dealing with a malady altogether distinct from the form above described. In the tubercular form, as I shall call it, there is an absence of all active inflammation; no premonitory symptoms of ear disease, except, perhaps, a slight feeling of fullness, and a corresponding impairment of hearing immediately before the discharge. Otherwise, the first evidence the patient has of ear disease is a perforation whistle on blowing the nose, and the staining of the handkerchief on applying it to the ear. Pain, which is so prominent a symptom in the other form, is absent in this—one of its dominant features. Again, on inspection we find instead of a red, bulging, and thickened membrana tympani, a pale, flattened surface, except in those rare cases called cheesy inflammations of the middle ear, when we have a cheesy accumulation behind it. The next characteristic sign which engages our attention, is the peculiar form and appearance of the perforation in the drum head. In the ordinary kind we have the thick, red, ragged, protruding lips of the rupture. In the one under consideration, we have what I call the "punched hole" perforation, with clean-cut edges, thin, pale, and flattened, usually situated close to the manubrium, either in front of or behind it—more frequently the latter. The secretion or discharge also differs, being thin from its first appearance. To recapitulate: No pain preceding the discharge; a thin, tightly-drawn, flattened membrane; a "punched-hole" perforation, either in front of or behind the manubrium, but in contiguity with it, more rarely situated in Schrapnell's membrane, but not quite so defined in character when in the latter location.

As destruction of tissue advances with the onward march of the disease, lines and characteristics change, but not suffi-

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ciently to obliterate its diagnostic and prognostic features. There will always be an uncanny and peculiarly unhealthy appearance denoting its malignancy. The soft parts under observation look macerated, and melt away as new tissue is being involved, like ice under the sun's rays. I have had the opportunity of watching these cases from the commencement. I have seen the perforation behind the handle of the hammer, not larger than a pin head, gradually enlarge in a circular manner; then the posterior edge of the manubrium would become exposed by erosion, and the same series of changes would next take place in front of the bone, finally eating it through, making one large opening, and so continuing in its destructive course. The mucous membrane of the tympanic cavity undergoes the same destructive changes. Politzer says that he has seen the walls of the tympanum, and the mastoid process in tuberculous subjects, as destitute of mucous membrane as a macerated bone.

These cases of myringitis seldom or never heal over. They are, as I previously stated, too often the immediate forerunners of final dissolution. Occasionally, but very seldom, they are stayed in their progress, but not by the effects of any local applications. In fact, topical applications of any potency irritate rather than soothe or heal, and seem to hasten the process of destruction.

SOME CASES OF INTEREST IN OPHTHALMIC SURGERY.

GEO. CLEARY, M. D., DENVER, COLO.

Case 1.—I. M., aged 35, a farmer, while engaged in cleaning out an irrigating ditch, was struck in the left eye by the point of a stick. As the intense pain caused by the accident continued despite the efforts of his physician, he sought my advice ten days after the occurrence. He was then suffering greatly in the eye, and over the corresponding side of the head and face. The lids were moderately thickened, the ocular con-

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juntiva very much congested. There was a tramnatic cataract, with swollen lens matter in the anterior chamber, occupying the outer and lower third of that space, and a large ragged ulcer in the outer side of the cornea; vision = shadow of hand. I prescribed for the eye atropine, iodoform ointment, and hot fomentations, ten grains of calomel to be taken at once, and morphine for pain during the night. The next day the ulcer seemed cleaner and more superficial, but spreading upwards; on the following day it was healing, and the spreading had stopped. The deposit of lens matter was adhering as a thick flake to the posterior surface of the cornea; pupil dilated. He felt very comfortable and was improving rapidly. He insisted upon going home (living in an adjoining county), but promised to return in a couple of days. I did not see him again, however, until the 18th of the month—six days after the last report. Pain had returned as severely as at first; eye again red and photophobic; ulcer, however, entirely healed; eye tension, + 1; temperature, 99°. While at home he had attended to his irrigating ditches and got his feet wet. I sent him to St. Joseph's Hospital. Afterward I applied to the temple an artificial leech, ordered eserine and hot fomentations for the eye, and gave him a mercurial purgative. Not getting any perceptible relief, ice cloths were substituted for the hot applications. There still being no abatement of the tension, pain, and other symptoms, on the 21st, assisted by Dr. C. P. Burnes, I performed an iridectomy upwards under cocaine. Great relief followed the operation until the 24th, when some pain returned to the eye; tension, +. Used mercurial inunctions night and morning, and, for the eye, eserine and fomentations. From now on the case progressed favorably and rapidly, tension became normal, and the felt-like lens matter in anterior chamber entirely disappeared. Complete absorption of the lens followed, with restoration of vision.

There is a prevailing opinion that a lens exposed to the solvent action of the aqueous humor, by rupture of its capsule, may go on to complete solution up to the twenty-fifth year of life, and that after this period the nucleus of the lens be-

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comes impervious to its action. From personal experience heretofore, as well as in this case, I am convinced that the age can be considerably extended, and still complete absorption in such cases be obtained. I am borne out in this opinion by some recent writings on the subject. It may be well, also, to recall the decided abatement of all the active symptoms during the first part of treatment, and the marked and permanent relief afforded following the iridectomy; and finally the absence of iritis throughout the progress of the case, the swollen lens matter having been for so long a time in contact with the iris.

Case 2.—H. C., aged 18, in 1889, while a member of the national guard, and engaged in a sham battle on the Fourth of July, received in the face the discharge of a blank cartridge from an opponent's musket, fired at a distance of a few feet. Besides powder marks on his face, I found a small perforation in the lower part of the cornea. The lens was opaque, but with no exudation of lens matter. On closer inspection, a foreign body was visible lying imbedded in the iris, in front of the perforation in the cornea. Assisted by Dr. Kimball, I performed an iridectomy, removing that portion of the iris in which the foreign body was lodged. Placing the removed segment of iris in water, the foreign body was found to consist of two cilias, united at their roots. The lens cleared up by absorption without any further trouble, and the eye made a good recovery. I considered this to be a very novel case at the time, from the fact that two eye lashes were driven through the tough cornea and lodged in the iris; but during the preparation of this article I made search for any similar cases, and found that it was not the only one on record. In the Archives of Ophthalmology, October, 1894, and January, 1896, I found two other cases somewhat similar. In the first one of these, four cilias were carried into the eye by a wire in baling hay. In the second case, the patient was struck in the eye by a scissors, several lashes being carried into the anterior chamber. At first they lay on the anterior capsule of the lens, but later on the posterior surface of the cornea, and finally they escaped through the corneal cicatrix.

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Case 3. A. W., a child eight months old, while lying on her nurse's breast, by a sudden movement of the head struck her right eye against the point of a large safety-pin which was sticking opened in the nurse's dress. I saw the child on February 2, three days after the accident, and found a ragged, elongated, perpendicular wound in the outer side of the cornea. The inner structures of the eye had apparently escaped injury. Pupils were well dilated. Antiseptics and atropine had been used by family physician. I continued the boracic acid solution, and ordered hot fomentations of the same, with instillations of atropine to the eye every two hours. Next day there was considerable infiltration surrounding the wound, and a collection of pus in the anterior chamber. February 7, pupil contracted; whole cornea hazy; infiltration in corneal substance more dense, and surface of cornea bulging; palpebral and ocular conjunctiva much congested; child evidently suffering a good deal. Under an anaesthetic, I passed a cataract knife through the base of the abscess cavity, performing the old Saemisch operation. This relieved pressure, and at the same time evacuated the pus in the anterior chamber. I then dusted iodoform on the cornea, after cleansing the wound, and continued the fomentations and atropine. I found on the following day that the ulceration had extended upwards, but the child slept fairly well and nursed better than heretofore. I kept the corneal incision open by daily passing a probe between the lips until February 18, when extension of ulcer had ceased and healing commenced at its edges; cornea clearing; pupil much contracted. By March 1, the whole ulcer had closed over and all irritation of the eye had disappeared, while the child's general condition was that of perfect health. On account of great haziness of the cornea throughout the latter part of the disease, I was unable positively to tell whether or not the iris had been implicated and was, therefore, anxious about the formation of adhesions, the pupil having remained persistently contracted. I was also apprehensive lest a large corneal scar would remain. As soon, however, as irritation had disappeared the iris responded to the action of the mydriatic, presenting a widely dilated pupil, and in time the cornea

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cleared up wonderfully. A month after the last date, scarcely a trace of corneal opacity could be distinguished. This case I think is worth reporting—in the first place, because of the nature of the traumatism; then the rapid formation of pus in the anterior chamber, and the great extension of the ulceration, even after the corneal incision; and lastly the happy termination of the disease, leaving a most useful organ with its beauty unimpaired.

Case 4.—I was called to see Mr. I. T., aged 50, the morning after the accident which had befallen him. I found the patient in the midst of his family, with his head tied up and one eye obscured by a bandage. His physician, who was present at the time, told me that Mr. T. had struck his eye against the back of a chair. I never got any other information as to how the accident occurred, but his appearance indicated that he had recently been under the influence of stimulants, and when the eye was unbandaged, the conclusion I drew was that his eyelids had been in forcible contact with a butcher's meat hook. I found that both the upper and lower lids, still united at the angle, had been torn from within outwards. In the upper lid, the tear extended through its whole thickness nearly to the outer canthus. The upper border of the tear in the integument reached nearly to the brow and followed the curved direction of the latter. There was also a perpendicular tear of the conjunctiva, meeting the horizontal one at about the center of the lid and running from its free border so as to allow the conjunctiva on the nasal side of the rent to hang down below the free edge. The lower lid was similarly lacerated, but the tear only extended to about its center. The detached nasal end of the upper lid was purplish. Dr. Kimball had already put in three sutures, attaching the upper detached lid above. The inner portion of the flap was curled up on itself, and displaced downwards, and the lower puncture was occupying a position close to the outer edge of the tear in the lower lid. I did not disturb the two outer sutures, but removed the inner one. The upper lid was unfurled and put in position by careful manipulation, securing it by three more sutures. The diffi-

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culty to overcome was to replace the prolapsed conjunctiva; but we finally succeeded by arming a thread with two needles, passing one through the outer and upper torn conjunctiva, carrying the latter on the point of the needle to its place, and then passing the needle out through the thickness of the lid. The other needle was passed in a similar way half an inch to the inner side of the first, and parallel to the free border of the lid. The ends of the thread were then drawn gently home, and tied externally. The lower lid required four sutures. The whole thing when finished had a decidedly decent appearance, thanks to the kind suggestions and valuable assistance of Dr. Kimball. The parts were warmed and cleansed with hot bichloride solution, and were finally dressed with iodoform ointment and cotton. The whole wound united perfectly, and the final result far exceeded our expectations, leaving scarcely a trace of the accident visible.

GRANULAR CONJUNCTIVITIS AND TRACHOMA NOT SYNONYMOUS.

ROBERT F. LEMOND, M. D., DENVER, COLO.

These two thoroughly important affections of the eye, which are in nearly every case referred to as being one and the same thing, I declare to be altogether different—as much so as pneumonia and pulmonary tuberculosis—and I think any one who will follow this paper right closely will agree with me in that there is a marked distinction between these two affections. I have reference more particularly to the chronic forms, from the fact that until they are thoroughly developed, neither trachoma nor granular conjunctivitis have on their full dress, so as to be readily pointed out.

Trachoma is due to a micro-organism, which differs but very little, according to Neisser, from the "diplococcus" of gon-

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orrhoea, which perhaps has for its origin vaginal secretion—at least it is so claimed by most writers on this little microbe.

This disease predominates in low altitudes, and is quite prevalent in malarial districts. I speak from experience, as I have practiced there, and it prevails in these countries sometimes as an endemic.

In this disease we have hypertrophy of the papillae of the conjunctiva, which extend above the conjunctival surface, and are of a dark hue, showing that the circulation is very poor. I will now give a number of the positive diagnostic symptoms, which will not fail in these two affections:

TRACHOMA.	GRANULAR CONJUNCTIVITIS.
In trachoma, we have no photophobia.	In granular conjunctivitis, marked photophobia.
In trachoma, no cupping of the cartilage.	In granular conjunctivitis, cupping of the cartilage.
In trachoma, no corneal complication.	In granular conjunctivitis, marked corneal complication.
In trachoma, no destruction of the epithelial layer of the cornea.	In granular conjunctivitis, often entire destruction of the epithelial layer of the cornea.
In trachoma, no ankylo-blepharon.	In granular conjunctivitis, ankylo-blepharon.
In trachoma, no contact between the cilia and cornea.	In granular conjunctivitis, cilia and corneal contact.
In trachoma, I seldom find errors of refraction.	In granular conjunctivitis, always find errors of refraction.
In trachoma, rarely do we ever have destruction of the conjunctiva.	In granular conjunctivitis, total destruction of the conjunctiva.
In trachoma, no blepharitis-marginalis.	In granular conjunctivitis, nearly always blepharitis-marginalis.

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In trachoma, we have but little secretion.	In granular conjunctivitis, a marked increase of secretion.
In trachoma, rarely ever involvement of the ocular-conjunctiva.	In granular conjunctivitis, the ocular-conjunctiva is always red and inflamed.

Now, as far as the origin of the two diseases is concerned, I claim that they are altogether different, and locality has a great deal to do with these two very aggravating eye troubles.

I find that granular troubles predominate in open prairie countries; and especially countries that predominate in lime dust, as we have in the prairie countries of Colorado, New Mexico, Wyoming, Nebraska, Kansas and Western Texas.

After this disease has become thoroughly established, if we will evert the lid and examine it with a strong glass, we can see that the granulations run in perfect little straight rows, and there are little excrescences with sharp points, which actually rise above the conjunctival surface, and if we cocainize this lid so as to render manipulation not objectionable, and take an applicator and pass over the lid, it will have a roughened, grating sensation—much the same as coarse sandpaper. The surface of this lid is very fiery and red; while in trachoma it has a dark red, velvety appearance, and the little nodulations are rounded, and not sharp as in granular conjunctivitis. We find trachoma more often in children, while granular conjunctivitis is usually found in persons from twelve years of age to even fifty.

One other strong argument in favor of these characteristic differences is, that we will find sometimes from two to five children in the same family all suffering with trachoma, showing its predominance in being transmitted from one to another in the same family; while in granular conjunctivitis, we will find one person in a family who possibly has had the trouble for ten years, and not another member of that family will have the same eye trouble. But understand I do not make the declaration that granular conjunctivitis cannot be

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transmitted—for I believe it can be by using the same towel, and not using some care regarding the attention of the eyes; but it has no transmissible tendencies beyond this, I think, while I believe that trachoma will be caught by children merely associating together. I can remember when I was in the Manhattan Eye and Ear Hospital, in New York city, we sometimes would have whole families affected with this trachoma; and the mothers of the children would say that as soon as they found one of the children had something wrong with its eyes, they would at once insist that it use a separate towel; but notwithstanding this precaution, the whole family would succumb to the prevailing endemic.

So far as the ravages of these two diseases are concerned, I regard granular conjunctivitis much more destructive, from the fact that it always carries a great deal of retinal hyperemia with it; and we know that where the retina has been chronically engorged for a long while, oftentimes it never does recover its visual accuity, not saying anything of the error of refraction that is always present in this disease.

So far as the treatment is concerned, that varies about as much as the diagnostic characteristics.

In trachoma, I always advise an operation upon the engorged lids. I prefer Noyes' forceps to any other method I have ever tried; usually anaesthetizing the patient with chloroform or ether, because this operation is very painful. Then, after the pulpy mass has been squeezed out, I use an astringent upon the eyes, being applied about once a day after the eyelids have been cocainized; and recommend that they be treated once a day for a week or two, and then possibly three or four times a week for a short time longer, and then dismissed. I sometimes use glycerite of tannin; sometimes a weak solution of argentum nitras—from one to five grains to the ounce—and sometimes cupric sulphate solution—from one-half grain to four grains to the ounce; and I have different strengths of the glycerite of tannin—usually about four different strengths—because some will require a stronger solution than others, and vice versa. I think, however, that many different kinds of astringents might be used with curative effect; but I merely give those that I am most partial to.

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In granular conjunctivitis I rarely use Noyes' forceps on the lids, but sometimes I use mechanical abrasion with cotton on the applicator to the lids after they have been thoroughly cocainized, and get up a hyper-secretion and excitation about the lids, for it is by absorption and excitation continually that the cure is produced. After rubbing the lids with a cotton pledget on the applicator, I often apply a solution of argentum nitras—from five to ten grains to the ounce. If this does not work well, I soon change to something else—cupric sulphate solution, from two to eight grains to the ounce. Salicate of soda is also thought to be a splendid stimulant—ten to fifteen grains to the ounce.

If there is much cupping of the cartilage, of course we can not hope to relieve this except by surgical interference, because it is simply a question of mechanics that we have to deal with. If the cilia is dragging upon the sensitive cornea, of course this will have to be relieved before the eye can ever be cured. I do this by making an incision just back of the cilia, down through the muscular tissue to the cartilage, and if the cartilage is badly cupped, I slit the cartilage, making a horizontal incision from one-eighth to three-eighths of an inch, and then I take out an eliptical form of the muscular tissue extending from the inner to the external canthus. I gauge its width according to the involvement of the lid. I then bring the ends of the cut muscular tissue together and stitch them, usually using about four stitches. If this operation is properly done, it usually relieves the mechanical abrasion which helps to keep the eyeball continuously irritated. After the granular surface of the lid is healed, I then correct the error of refraction, and advise the constant wearing of glasses. This I think will do much to prevent the return of the disease, and in my experience has worked well.

A CASE OF SYMPATHETIC OPHTHALMIA.

E. C. RIVERS, M. D., DENVER, COLO.

On June 16, 1891, J. W., a boy eight years old, was brought to see me on account of an injury to his left eye.

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Four days previously he was engaged in exploding percussion caps—such as are used on muzzle-loading shot guns—by means of a nail and hammer, when a portion of the copper cap struck him in the eye. An examination showed a corneal wound running vertically, about one-quarter of an inch in extent, somewhat ragged in its upper portion; iris entangled in the wound; corneo-scleral junction not involved; the anterior chamber partly filled with blood and opaque lens substance; eyeball more or less congested, but no pain complained of; could not count fingers. A solution of atropiae sulph., four grains; magendie solution, three drachms; solution of hygr., bicloride, 1 to 5,000, enough to bring the quantity to one ounce, was prescribed, to be used three times a day at home, and a similar drop was instilled at each visit to my office, which for the first two weeks were made nearly every day, and the succeeding eight days, every second day. There was at no time any considerable inflammation. As the anterior chamber cleared up, a wound of the iris, corresponding to the one in the cornea, and a contracted pupil filled with opaque lens came to view. The immediate enucleation of the eye was considered from the first. It was decided in the negative, because, firstly, the eye was not troublesome nor inflamed, nor muchly disfigured; secondly, on account of the extreme youthfulness of the patient that side of the face might not develop equally with the other; and finally, because the patient lived only a few miles from Denver, on the line of a railroad running several trains each day, so that he could reach me in a few hours after any unfavorable symptoms supervened. The expectant plan was adopted—to save the eyeball as long as possible—to enucleate as soon as it became necessary. The drops above mentioned were continued, and the father was thoroughly advised of the dangers as well as the indications of sympathetic trouble, of the great necessity of operative procedures in the very beginning of the disease, and with final instructions to return with the boy immediately on the appearance of the slightest symptoms of trouble, he was allowed to return home about one month from his first visit.

Uniformly favorable reports were received from time to time of the progress of the eye, but I have no note of any ex-

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amination made until October 23, when the opaque lens had absorbed and a piece of copper or brass could be most distinctly seen through the pupil, immediately behind the iris, just where the incision in this membrane had occurred, and where it had been discovered some time before his visit to me by the members of his family.

There was no vision in the eye—not even perception of light. The corneo-scleral region nearest to it, and consequently nearest to the corneal scar, was slightly flattened. The operation for the removal of the foreign body for some reason was not performed until the 28th—five days later—when a large incision was placed in the limbus of the cornea, a free and large iridectomy made, including all that portion of iris that had received injury at the time of the accident. The foreign body was found situated just posteriorly to the iris, half way between the pupil and the peripheral attachment. It did not touch the ciliary body, but was held firmly in place by inflammatory deposit. It was withdrawn by forceps, and required considerable force to remove it. It proved to be very irregular in shape and to be nearly one-half of the original cap. The operation was done under chloroform; the instruments, etc., disinfected previously. The wound healed nicely, with no pain or inconvenience of any kind. On the ninth day after the operation the little patient was allowed to go home, reporting at my office again at the end of a week, when the eye was found free of redness or pain, and he was dismissed from observation, the parent being again reminded of the necessity of keeping up a constant watch over the good eye, and to return to me immediately upon the slightest sign of trouble or complaint.

His next visit was made on February 23, 1892—eight months after the original injury, four months after the operation. There had been no trouble with either eye noticed by his parents, nor had the patient complained of any weakness or inconvenience at any time until three or four days before when he had waked up in the middle of the night and complained of severe pain in his good eye. In the morning it had looked inflamed; but notwithstanding my injunctions, they had concluded it was a cold and had waited three or four days to see if it would not

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pass off. I found the injured eye still free of inflammation, but the good eye red and watering, the iris inflamed with a slight point of attachment already formed between lens and edge of pupil. Atropia sulph. (grs. iv., oz. i) was used energetically, with hot baths, with only slight abatement of his symptoms. On February 26, about one week after the outbreak of sympathetic inflammation in the right eye, there seemed to be a slight increase of the iritis, so the left eye was immediately enucleated. The inflammation in the right eye at first seemed to improve after the operation; the pupil had responded from the first well to atropine. Some days the eye would be almost free of redness and lachrymation, and the little fellow would always say he could see all right. Gradually the cornea became punctated; the pupil at the end of three or four weeks had become less dilated; the iris began to look spongy. The angle of the anterior chamber became narrower. A few weeks and all these changes grew more apparent. Notwithstanding the frequent use of atropine, the pupil became steadily narrower until the edge in its whole extent was in contact with the lens capsule. Around the edge of the iris in the pupil there soon formed a border of grayish-white deposit very slowly extending itself over the capsule toward the center of the pupil, dragging the iris after it. That same deposit seemed to be taking place all under the iris even, up to its ciliary attachment. The iris, by the middle of spring (April 22), had completely lost its original blue color; blood vessels could be seen on its surface; the anterior chambers had become quite shallow and its contained fluid quite turbulent.

The treatment seemed to have little, if any, effect on the course of the disease; the picture became more and more gloomy, until June 3, just lacking ten days of being the anniversary of the original injury, he returned home with only perception of light. Hope was entertained that the country air might aid sufficiently the treatment to arrest further destruction. It did not. A few months more and all perception of light had disappeared; the eye was in a condition of phthisis bulbi.

The course of the disease was not as regular as I have described it; it progressed rather by exacerbations; for a few

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days all the symptoms would improve and our hopes revive, only to be shattered by a sudden renewal of severity all along the line. After each of these attacks the eye never returned to as good a condition as it had been previous to it.

The retina and nerve showed no implications as long as the ophthalmoscope could be used, and apparently were the last structures to be involved; for as long as the slightest portion of the pupillary area remained free of plastic deposit, his sight was remarkably good, even after the eyeball began to show unmistakable softening.

Another point that struck me forcibly was that, notwithstanding the blocked condition of the angles of the anterior chamber, I failed at any time to find any but the slightest evidences of plus tension, and at no time during the whole trouble was there the slightest pain except when he was awakened the first night on account of pain in his "good eye." The treatment of the case consisted, besides the atropine and duboisin, of hot bichloride solution constantly applied, hot poultices as recommended by Dr. Ayres, leeches to the temple and blisters. Part of the time the patient was kept in a moderately darkened room; finally confined to bed. Internally he was given full doses of mercury in various form, and of iodide of potassium to full tolerance. Mercury was also used by inunctions. Quinine, iron, etc., etc., as advised by the various consultants who were asked to see the case, the treatment singly or collectively having to my mind absolutely no influence over the disease.

I have reported this case because in looking over the literature at my command, I have been struck by the few cases therein of such cases ending in blindness; nearly all the cases have recovered. A great many different methods of treatment have been instrumental in bringing about these favorable results. Consequently, I was very much encouraged at first to hope for the same happy termination in mine. I was soon brought to the conclusion, however, that nearly all these cases of recovery *are not cases of sympathetic ophthalmia*, but only cases of iritis or other disease of the eye that happen to occur at the time the fellow eye is suffering from an injury, and not *on account of* the injury. If they were cases of sympathetic

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ophthalmia, then mine was of a different breed. The cause of the sympathetic outbreak coming on eight months after the injury, and four months after my operation, I ascribe to the former, although it would be impossible to say that it was not entirely due to the operation itself for the removal of the foreign body. During the last few years several articles have appeared in which among the substances that give rise to sympathetic trouble when inserted in to the eyeball, copper was stated to be the most innocent. It was stated, if I remember correctly, that in cases where even large pieces of this metal entered the eyeball and remained there, the dangers were so slight that they might be almost disregarded. This theory was not proven true by my case.

ADENOID VEGETATIONS—TREATMENT AND EXHIBITION OF INSTRUMENTS.

DR. F. E. WAXHAM, M. D. DENVER, COLO.

Adenoid vegetations, adenomata, Luschka's tonsil, the third tonsil or pharyngeal tonsil, is an enlargement or hypertrophy of the normal glandular tissue found in the vault of the pharynx. It is the analogue of the faucial tonsils, and both conditions are frequently met with in the same case. It is a disease of childhood and youth, being rarely met with in adult life. There is a tendency to atrophy with advancing age, as is the case with the faucial tonsils. The disease is most frequently seen in damp climates, and a strumous dyscrasia is a strong predisposing cause. Some authorities believe that heredity is an important factor in causation; while all agree that acute colds, measles, scarlet fever and diphtheria often act as exciting causes. Many cases are congential.

Symptoms—Among the prominent symptoms Bosworth mentions as the most important, the excessive discharge of mucus or muco-pus from the diseased glands, their function being greatly increased and stimulated by their diseased condition. This secretion may escape through the anterior nares in

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the form of a thick, ropy, muco-purulent discharge, or it may be drawn down into the pharynx and voided through the mouth. While this symptom is frequently seen, yet it is my observation that it is by no means constant, and quite as frequently absent as present. In my experience the most prominent and noticeable symptom is oral respiration, giving rise to an expression of the face that can never be mistaken. It is true that oral respiration may be produced by any condition causing nasal obstruction; as by the presence of polypi, either mucous or fibrous, posterior hypertrophies of the turbinated bodies, or the presence of foreign impacted bodies in the nasal cavities. Excluding these conditions, the oral respiration must be due to adenoid vegetations.

Adenoids producing marked obstruction give rise to a peculiarly vacant expression that once observed cannot be forgotten. The constantly open mouth is almost pathognomonic of the presence of adenoids. The sleep at night is disturbed; the child snores loudly and is very restless. On account of the difficult breathing at night, the restlessness and disturbed sleep, the child often suffers from headache during the day, becomes listless, loses the appetite, and the general health may become greatly impaired. On account of the constant oral respiration, the patient often contracts chronic pharyngitis, and frequently bronchitis. Asthmatic attacks not infrequently complicate the disease and help to render the child's life more miserable.

Another quite characteristic symptom is loss of resonance of voice—it becomes nasal in character and reminds one of a cold in the head. Another symptom frequently met with is deafness, due to pressure or overlapping of these growths upon the orifices of the Eustachian tubes. Hypertrophic tissue is always prone to acute inflammation, and hypertrophy of the pharyngeal tonsil forms no exception to the rule. With active inflammation this glandular tissue becomes greatly enlarged and the discharge greatly increased. Hence it happens that while the patient breathes with difficulty through the nose at all times, yet when a cold is taken, this difficulty is greatly increased and nasal respiration becomes entirely impossible.

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The restlessness and loud breathing at night becomes greatly aggravated and all the symptoms are increased.

On account of the absence of the natural current of air through the nares and consequent diminished atmospheric pressure, the nasal cavities as a rule become contracted, and for the same reason the arch of the palate is found to be very high and narrow.

Diagnosis—The only conditions likely to be mistaken for adenoids are mucous and fibrous polypi, impacted foreign bodies, and hypertrophy of the posterior ends of the turbinated bodies; all these conditions may cause nasal obstruction and oral respiration. Polypi, however, both mucous and fibrous, are rarely met with in childhood. Anterior rhinoscopy will reveal them and their location, should they be present. Foreign impacted bodies may cause nasal obstruction in one or both nasal cavities, but careful anterior rhinoscopic examination and the use of the probe will reveal them if present and imbedded in the tissues. Posterior hypertrophy of the turbinated bodies is very rarely met with in childhood, and may be almost excluded from the question of diagnosis. When present it can only be determined by posterior rhinoscopy. In young children, where examination with the mirror is almost impossible, we must be guided in our diagnosis by the mouth breathing, snoring and restlessness at night, the peculiar facial expression due to the open mouth breathing, and the impression imparted to the finger when passed into the pharyngeal vault. Adenoid tissue may present to the touch a round, smooth, globular mass nearly or quite filling the vault, or may present a soft, irregular mass easily crushed and broken down under the finger. These specimens well illustrate the peculiar structure and appearance of these adenoid growths.

These growths may be removed by means of chromic acid most carefully applied by means of a properly curved applicator passed to the vault by way of the pharynx. Sometimes in older children or young adults they may be destroyed by means of the galvano-cautery. In either case many sittings are required, and it is necessary to have the confidence and co-operation of the patient. When removed by either

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method it becomes necessary to thoroughly anaesthetize the parts with cocaine.

Instead of the chromic acid or the cautery, these growths may be removed by means of cutting forceps, or with proper curettes. Hartman, of Berlin, uses almost exclusively these curettes, which I take pleasure in presenting. Others prefer Loewenthal's forceps or some modification of them. Personally, I prefer this instrument, known as Gottstein's curette. It is passed upward behind the soft palate to the very vault of the pharynx, and then with one sweep of the instrument downward the growth, or the greater part of it, is removed. The remnants of the growth are then removed by the finger or the forceps. In the older children and young adults it is not necessary to give an anaesthetic, as these vegetations can be effectually removed under cocaine by means of the curette and forceps; but in young children it is absolutely necessary that an anaesthetic be given if the work is to be well and thoroughly done. Chloroform is generally preferred, and it is my custom to place the child on a firm table in a good light. After the anaesthetic is given, I pass a soft rubber catheter through one nasal cavity and bring one end out of the mouth, tying the two ends over the upper lip. This acts as a good palate retractor, bringing the soft palate well forward and out of the way of the instruments. The head is lowered that the blood may not pass into the trachea, the curette is passed up into the vault, and the instrument, with firm but gentle force, is brought downward, thus sweeping the vault and upper posterior wall of the pharynx. The patient is then quickly turned upon the side, with the head still well lowered, that there may be free escape of blood, which flows copiously for a few moments. When the hemorrhage has ceased, more chloroform is given, the index finger introduced into the vault, and any remnants of the growth broken down and scraped away. If any portion of the growth resists the finger it is removed by means of the forceps. Dr. Lenox Brown, of London, frequently removes these growths with the finger alone, without the aid of instruments and frequently without an anaesthetic; but I am convinced that the more humane and thorough method is the one that I have described.

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This condition is one that is very frequently observed by the general practitioner, and is often attributed to enlarged tonsils; these are removed without benefit, and the case frequently abandoned. No benefit is derived, because the obstruction in the vault still remains after the removal of the faucial tonsils just as before. On the other hand, when this growth is thoroughly removed there is no operation that is more satisfactory, and the benefit derived is often remarkable.

DISCUSSION.

Dr. P. F. Gildea—It is well stated, Mr. President, that each man works his own instrument. It seems to me that any one who has ever seen Lenox Brown operate with his finger nail, if he could do as good work, would never use anything else. The removal of adenoids is not a very painful operation in his hands, because he does it so quickly; and I have yet to see a case in which everything was not removed after he had operated. Chiari uses a cold snare through the nose, and the way he succeeds is something remarkable. He also does a clean and thorough operation, and leaves nothing behind. In young children I prefer to operate with the finger nail; but in older children, where there may be an intermixture of fibrous tissue, I believe in the use of the Gottstein curette. I use no anaesthetic in the nose of young children, but cocainize the older ones.

Dr. G. Melville Black—I believe this to be a subject especially worthy of discussion. It is a condition very commonly met with in children, and what is still more common is the frequency with which it is overlooked. It is to be regretted that so many cases are allowed to go from year to year, until distressing symptoms become urgent, before they are recommended by their medical adviser to seek our advice. If the medical profession generally were more fully acquainted with the symptoms and the clinical appearance of a child afflicted with adenoids, we would see these children earlier, and annoying sequelae would be avoided by prompt and effective treatment. We have a few laryngologists who recommend waiting until some urgent symptom becomes manifest before operating. I could never see why it is expedient to subject the child to the

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danger of waiting. An attack of diphtheria or scarlet fever is liable to attack our little one, and with its throat filled with adenoid growths and enlarged tonsils, what show has it against these dread diseases? As we well know, suppurative and chronic inflammation of the middle ears are among the most common of sequelae. Why subject such a child to a danger of this kind any longer than possible? There are too many deaf people in the world now, and I am free to state that adenoids are largely responsible for it.

The operation for the removal of adenoid tissue in the vault is not what I would call a dangerous operation. I have never as yet had an unfavorable symptom during or after the operation. there have been a very few cases reported of fatal hemorrhage. The danger, to my mind, lies in the anaesthetic. These children are frequently in bad physical condition. They do not stand shock well. I am a firm believer in complete anaesthesia. To my mind there is more danger when operating under partial anaesthesia than when it is profound. If the anaesthesia is complete, the patient is fully under control, and there is not as much danger of the patient sucking the blood down into the lower air passages, as there is when the little one is struggling, fighting, gagging and choking from our efforts to remove the growths in its throat, when only partially anaesthetized. The operation can be done in less time, and with certainly less shock. It is always well to give an hypodermic injection of strychnine before operating.

When it comes to instruments, I can recommend only two —Gottstein's curette and the finger nail; Gottstein's curette to remove the bulk of the growths and the finger nail to finish up with, such as clearing out the region about the posterior nares and around the Eustachian prominences.

One point I want to emphasize, and that is, that it is almost the invariable rule to find adenoids with enlargement of the tonsils, and vice versa. I have met with a number of cases where the tonsils had been very beautifully removed, and whoever removed them did not recognize that adenoids were present, hence they were not removed, and the child made no improvement. I would strongly urge that when tonsils are being removed in children, the region of the pharyngeal vault

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be explored with the finger for adenoids. They will almost invariably be found.

It is my practice where there are enlarged tonsils and adenoids, to remove the tonsils first; then introduce the curette, turn the child upon its belly with its head lowered over the edge of the table, introduce the finger while the child is in this position, and complete the operation.

I wish every member of this society could have heard this paper of Dr. Waxham's. We can't hear too much of this subject. The laryngologist does not have the opportunity to observe all the members of the families he treats. It is the family physician who cames in close contact with them, and they depend upon him to advise them from time to time if anything is going wrong. We all know that it is not infrequently the case that a child has been allowed to go an unnecessarily long time before the family physician recognized adenoids.

Dr. Robert Levy—I have but a few words to say on the subject under discussion. Dr. Waxham has presented the matter in a very concise and complete form. In the matter of diagnosis, however, I am not sure that it is always as easy as we have been led to believe by the foregoing speakers. I am satisfied that one very important point in the diagnosis is to determine just how much of the symptoms is due to the enlargement of the tonsils, and just how much to hypertrophy in the naso-pharynx. We frequently find people who are willing to undergo the tonsil operation who will not undergo an operation for adenoids; and, therefore, I think it is an important matter for us before deciding on the operation, and before advising our patients, to determine how much of the symptoms is due to each or both conditions. I am satisfied that in a majority of cases we have hypertrophied tonsils in conjunction with adenoid vegetations. I am satisfied, also, that there are cases in which many of the symptoms here enumerated are due to hypertrophied tonsils alone, when naso-pharynx is not sufficiently hypertrophied to produce the symptoms. Also, in addition, little patients suffer frequently from purulent rhinitis, and this has at times given me some difficulty in the matter of differential diagnosis. There are cases in which this

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rhinitis causes mouth breathing and other symptoms of obstruction.

In the matter of anaesthesia, I cannot agree with Dr. Black, that the patient should be thoroughly under the influence of an anaesthetic. I am satisfied that the operation can be done with the patient only partially under an anaesthetic, and I think there is an advantage in having the patient only partly under the influence of chloroform, for we may relax the patient sufficiently and still not completely paralyze the reflexes of the pharynx, thus allowing blood to be swallowed instead of inspired. I am in the habit of giving the patient an anaesthetic only to the point of complete relaxation, and not through anaesthesia. In fact, the matter of anaesthesia is a very important one in these operations; so much so, that in my recent visit East I found many of the prominent men discarding anaesthetics entirely. Dr. J. Solis Cohen told me only a few days ago that he never gives chloroform, but does the operation very quickly with forceps or curettes, or both combined, without the use of an anaesthetic. I believe, however, that with proper care we need not be afraid of giving an anaesthetic, and we can perform the operation much more thoroughly. As to the use of a palate retractor Dr. Waxham speaks of, I think that is unnecessary.

I also desire to enter another protest to Dr. Black's statement of the lack of danger in this operation. I believe that this operation is one attended with considerable danger, at times; we must not go away with the idea that it is not so, because a case with which we use ordinary precaution gets along nicely. I never undertake an operation for adenoids, or adenoids and hypertrophied tonsils combined, that I do not feel beforehand a considerable responsibility. I believe this is one of our dangerous operations.

Dr. W. W. Bulette—I am satisfied from my own observation that adenoids can be operated upon without the use of anaesthetics; and I think in the administering of an anaesthetic we need not go beyond the first stage. I think there is great danger in administering chloroform beyond that.

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TREATMENT OF HAY FEVER.

WILBUR W. BULETTE, M. D., PUEBLO, COLO.

There is, perhaps, no disease which the physician is called upon to manage, that requires more careful judgment than the treatment of hay fever.

No specific has as yet, nor probably ever will be found to cure the affection; each case is a law unto itself, and rarely can any two sufferers be treated and managed precisely alike.

As the result of my own experience, I here make the bold assertion that more than eighty per cent. of individuals suffering from hay fever can be permanently and effectually cured.

I am well aware in making this statement that it is not fully in accord with the opinion of the majority of the profession, but the reason that an adverse opinion so largely prevails is because physicians are apt to be careless and indifferent in the examination and treatment of this class of cases. .

We must thoroughly examine our patients from head to foot, interrogate every organ of the body, and eliminate every possible source of irritation, and each pathological condition.

The mode of living must be inquired into and often modified, the diet must be carefully regulated, and systematic rules of hygiene should be instituted and insisted upon. In medicine it is often the little things that count for much, and nowhere is this fact more fully emphasized than in the treatment of the affection under consideration.

A large number of the cases of hay fever occur in persons who have inherited or acquired a catarrhal tendency. They have had measles, pertussis, scarlet fever, croup, tonsillitis, quinsy, and like troubles; also, frequent attacks of coryza, or "head colds." Still another percentage acquire or inherit—more frequently the latter—a condition akin to lithaemia. We find an excess of uric acid in the system, the patient suffers from disorders of digestion and circulation, the general nutrition of the body is impaired, and such individuals exhibit an abnormal sensitiveness of the respiratory tract to certain sources of irritation which may be described as an idiosyncrasy. The urine is abundant, high-col-

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ored, distinctly acid, specific gravity often 1030, and deposits crystals of uric acid, urates and phosphates. During the exacerbation there is a super-acidity of the alimentary tract.

So far as the writer can learn, no systematic study has been made of the urine during attacks of hay fever, but it offers a fertile field for investigation. It is possible that the urine becomes of high specific gravity and deposits solids in excess, because of the fact that such large quantities of serum are lost through excessive nasal secretion.

Hay fever is undoubtedly caused by mechanical irritants in the atmosphere, acting upon a hyper-sensitive nasal mucous membrane, in persons of a neurotic temperament. This does not mean that all persons affected are highly nervous; some are of nervo-bilious, others of nervo-sanguineous temperament, but all belong to the active, energetic class of so-called nervous organizations.

As was well established by Wyman, the disease is frequently transmitted from generation to generation, and it is not an uncommon thing to be called upon to treat parents and children, and even grand-children, at the same time.

That the causes which produce the affection act alike upon many thousands who may have inherited or acquired a susceptible tendency, and yet that only a small percentage are attacked, is admitted. There must, therefore, be some individual pecularities which predispose certain persons to the trouble. These are: A nervous element, or a neurosis, as established by Beard, a local pathological lesion in the nares, demonstrated by Daly, and the presence of a mechanical irritant in the atmosphere, as shown by Blackley.

I have never seen a true case of hay fever in which these three conditions were not present; and I further affirm that no one is susceptible to an attack of hay fever in whom one or more of these conditions is absent.

In certain sections of Colorado there is a variety of the affection known amongst the laymen as blossom or cottonwood fever, and very prevalent in regions where the cottonwood tree abounds. The symptoms are practically identical with those of the autumnal variety, except that the throat and bronchial irritation is intensified, and the course of the attack is somewhat shorter.

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In the form under consideration the symptoms manifest themselves about the 12th of April, and terminate the latter part of May, rarely running longer than June 1.

The following report of a case recently treated will illustrate the spring or cottonwood variety of this affection:

On March 12, 1896, Mrs. S. consulted me for advice as to what could be done to cure her of cottonwood fever, from which she had suffered each succeeding spring for six years. She had been under the care of other physicians, all of whom had advised that nothing could be done to alleviate her trouble.

The following is her history: Age, 35; born in Missouri, of Anglo-Saxon parents; spent most of her life in Central Pennsylvania, among the Allegheny mountains; came to Pueblo, Colorado, seven years ago, and has lived here since. Father was killed in the war; was strong and vigorous; had no nose or throat affection; parental grand-parents were also free from disease of the respiratory passages. Mother suffers from rheumatism and nasal catarrh, which is worse, and has been for some years, in the late summer; a maternal aunt has had nasal catarrh for years; also attacks of hay fever. As a child was subject to croup; had several attacks of tonsillitis and quinsy; measles at twelve, whooping cough and mumps at thirteen, diphtheria at fourteen years of age. Was strong and healthy until age of twenty-eight, when she had a severe attack of typhoid fever, and within the past six years has had repeated attacks of rheumatism; suffers from nervous headaches, dull pain across bridge of the nose, over eyes, and in occiput, and has also suffered for some time with granular lids. Menstruation has always been regular and painless; had miscarriage four years ago; has one child five months old, which she is now nursing. Appetite usually good; bowels irregular, tendency to constipation, and is troubled with hemorrhoids; kidneys active; sleeps well. Patient is well nourished, rather corpulent, weighs 158 pounds, and is of a nervo-bilious temperament.

About April 12, she experiences a feeling of lassitude, and tires on slightest exertion, with depression of spirits; sense of uneasiness about nasal passages, disposition to sneeze; itching and burning in and about nasal cavities, extending to roof of mouth and soft palate; often a stinging, sharp pain in nose

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and along the free margin of the soft palate; excessive watery discharge from nose and itching of eyelids; the trouble progresses until April 25 to 28, when the symptoms become intensified, discharge from nose becomes muco-purulent, uncontrollable sneezing, nares become occluded so that mouth breathing is imperative, great irritation of the eyes with lachrymation, loss of sense of smell, some impairment of taste, anorexia, sleeplessness, violent paroxysms of cough with some expectoration, hoarseness and sometimes loss of voice for some days. Two years ago asthmatic symptoms developed; the attacks were spasmodic in character, coming on usually between 12 and 1 o'clock, so that she was unable to recline in bed, having to be propped up with pillows.

These symptoms are intensified in paroxysms, and are aggravated by sudden changes in temperature, by sun and artificial light, exposure to dust, or after exertion.

The symptoms continue uninterrupted until about May 15 to 20, when they disappear, and patient enjoys good health until the succeeding season, except that she cannot at all times breathe through her nose.

Upon examination I found the inferior and middle turbinates on the left side greatly hypertrophied, a large spur from vault of naris pressing against both the middle turbinate and the septum.

This mass was so exquisitely sensitive that touching it with a cotton-tipped probe provoked a violent paroxysm of sneezing and cough. On the right side, the middle turbinate was normal, but the inferior was much enlarged and pressed against the septum which was slightly deviated to the right; a cartilaginous spur was also found springing from the vault of the naris and adherent to the septum at sutural attachment of the vomer with the triangular cartilage. There was also catarrhal pharyngitis and laryngitis, and slight enlargement of the faucial tonsils.

I removed the spurs on each side with saw and chisel, and cauterized the turbinates and sensitive areas of the nares with tri-chlor-acetic acid. She was kept under observation until May 25, and was this season free from usual symptoms, except for three days there was some cough.

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During treatment patient's urine was examined several times, and was found highly colored, distinctly acid, specific gravity 1028 to 1032, and depositing solids in excess.

In a disease presenting such a variety of symptoms, it is impossible to lay down fixed rules for treatment; each case must be managed on its merits.

The first important step in the treatment is careful regulation of the diet, a mixed one being preferred in which neither the nitrogenous nor carbohydrate elements predominate; the nervous system should be fed, all excesses are to be held in abeyance, alcoholic stimulants absolutely forbidden, systematic rules of hygiene should be instituted as has been seen, and often a change of occupation may be necessary.

The morbid lesion of the nasal passages should next receive attention, whether it be a deflected septum, exostosis, enchondrosis, polypus, or hypertrophy and vascular turgescence of the turbinated bodies. In young subjects, in addition to intra-nasal disease, we often observe adenoids of the pharyngeal vault, and enlargement of the faucial tonsils. These should also receive attention. A most critical examination of the nares should be made in all cases, as, when it is remembered that the nasal mucous membrane in adults covers an area of about twenty-six square inches, it is easy to understand how disease may remain undiscovered in some part. The neurotic conditions are often excited by intra-nasal pressure, which is either constant or intermittent between different parts of the interior of the nose. This pressure may exist between the turbinated bodies and the septum, or between the turbinals themselves, or between the inferior turbinate and the floor of the nose.

To achieve the best results, treatment should begin from six to eight weeks before an expected attack, and I do not believe it good surgery to perform a radical operation in the nares during the exacerbation of the affection, as the proper conditions for good surgical repair are wanting when engorgment is so great.

If the case comes under observation during the attack, we can only palliate the trouble.

Great benefit will often result from applications of trichlor-acetic acid or the galvano-cautery to the sensitive areas,

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and of these agents I prefer the former; the reaction after its use is not nearly so great, and the parts heal more kindly than after the use of the galvano-cautery; deep cauterization and wholesale destruction of the mucous membrane cannot be too strongly condemned. In the majority of cases the posterior two-thirds of the inferior turbinals, and the septum, are the most sensitive areas, and failures so often result from local applications simply because these areas are not reached; this is particularly true of the extreme posterior ends of the inferior turbinals, and contiguous portion of the septum.

Where posterior hypertrophies are sufficiently large to be grasped by the cold wire snare, the hyper-sensitive condition can often be relieved by the use of this instrument.

In cases where the turbinates are very large, and are hard and fibrous, I like the use of the nasal trephine, running the instrument from end to end of the turbinal under the mucous membrane; by this operation none of the membrane is destroyed except point of entrance and exit of the instrument, and the result is more permanent than cauterization.

Gently clipping the lower edge of the inferior turbinate throughout its entire length with curved scissors will often give marked relief.

In addition to alkaline sprays to the nares, applications of

Tannin ..... gr. v.
Boric acid ..... gr. x.
Cocain ..... gr. i.
Oil hydro-carbon comp. ..... fl. ℥ i.

alternating with inhalations of solutions of

Carbolic acid (crystals) ..... ℥ i.
Camphor ..... ℥ iss.
Chloroform ..... ℥ iiss.

used in a smelling bottle, will often do much to palliate the distress. The former mixture I particularly like because it is not readily absorbed, and on account of its consistency will lie in contact with the parts for hours. Internally a pill of

Hydrobromate coniium ..... gr. ¼.
Chloride ammonium ..... gr. ½.
Pulv. opii., extract belladonnae, and extract aconite ..... aa gr. ⅛.

given every two or three hours, will often allay the irritability of the nasal passages and stop excessive secretion.

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I wish to emphatically condemn the indiscriminate use of cocain sprays, as its effect is but transient, and after its use the nasal mucous membrane is left in a worse condition than before; besides, the habit is so readily acquired; in my judgment one had far better remain a sufferer from hay fever, than to endure the everlasting torture of cocain inebriety.

Amongst the drugs which I have found to act well in this affection, are potassium iodide in gradually increasing doses which may be dissolved in essence of pepsin (Fairchild), alkalithia (Keasbey and Mattison), valerianate of quinine, strychnia, arsenic, phosphide of zinc, hyoscyamus, and preparations of iron.

I frequently give the following pill:

℞ Zinci phosphidi.....gr. 1/60.
Quininae valerianas.....gr. ii.
Extract nucis vomicae.....gr. 1/8.
Hyoscinae hydrobromas.....gr. 1/60.
Ft. pill No. 1.
S.—Take before meals, followed after meals by Fowler's solution.

Many of the alkaline mineral waters are valuable; frequent salt bathing, followed by brisk rubbing, is grateful and keeps the skin healthy.

For cough and bronchial irritation I have found nothing better than gelsemium internally, and intra-laryngenal injections of a mixture of

Menthol.....gr. x.
Guaiacol carb.....gr. vi.
Europhen.....gr. x.
Oil pine needle, eucalyptol and cajeput..aa ℥ i.
Therapol, q. s. ad..... fl. ℥ ii.

To allay the irritation of the eyes, applications of cold or hot water, according to the sensations of the patient, or a wash of

Boric acid.....gr. xv.
Sodium chloride.....gr. x.
Extract hamamelis dest.....fl. ℥ ii.
Aq. camphorae.....℥ iv.
F. e. hydrastin.....gtts. vi.
Aquae, q. s. ad.....fl. ℥ ii.

Where the lithaemic condition is present, the usual diet and remedies for this complication are to be given.

The best results are seen when treatment is commenced several weeks before the expected attack, and to effect a per-

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manent cure in cases of long standing, the patient should be kept under observation during two or three seasons.

Certain it is that we cannot eliminate, to any extent, the third factor in the causation of the affection, namely, mechanical irritants in the atmosphere, but we can, as experience has shown, build up the nervous system, place the respiratory mucous membrane in a healthy condition thus rendering the individual less vulnerable, and prevent susceptibility to the action of the irritants in the atmosphere.

DISCUSSION.

Dr. Robert Levy—This is an important subject that should not be passed without discussion. Nothing gives us more trouble than hay fever; not only the specialist, but also the general practitioner. It seems to me that the paper on this subject admits of discussion to the extent at least of giving ideas as to the best method of treating hay fever. Dr. Bulette failed to call attention to one point that ought to be of special interest to us in the treatment, and that is the effects of climate; and I was very much disappointed that he did not go into that. I think that is one of the important features in the treatment of hay fever. Without wishing to open the discussion, however, on that point, I will simply say now that I believe we have a climate in Colorado that is quite beneficial in cases of hay fever, especially when combined with proper treatment. The reasons for this I do not think the time warrants me in going into. I wish also to call attention to the fact that Dr. Bishop, of Chicago, has advanced ideas in the line Dr. Bulette has spoken of—namely, the uric acid condition which is frequently associated with hay fever. The way that I happened to become acquainted with this theory was, that at about the same time I was making a few investigations along the same line, upon myself. I found that I had a few symptoms of hay fever—itching sensation in, and watery eyes, and especially itching in the hard palate, and I believed I was going to have hay fever. About the same time I began to have slight twinges in my muscles and joints. I examined my urine and found it was highly acid, very high specific gravity, excess of uric acid. I placed myself upon a strong anti-lithemic diet

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and medication, and my symptoms were relieved. Then I investigated the matter among my friends, many of whom had similar symptoms; a few of them had the same condition of urine, and I began to think there was not so much in it after all. I am now in doubt as to whether uric acid has much to do with it or not.

Dr. Wilson—I have had a son who for four years has been attending the Princeton University, in New Jersey. Being somewhat of an athlete, he engaged in the games there and contracted hay fever. Whether the athletic games had anything to do with this or not, I do not know; but he never had any symptoms of it before going to New Jersey. Every spring he has hay fever while he remains at Princeton, and he has suffered from two to three weeks before the end of each succeeding term in the spring of the year; but it has always left him when he returned to Denver. He is only here a day or two until he is quite relieved, and has no further trouble with it until the following year back in New Jersey. He completes his course this year, and I am greatly in hopes that he will not suffer from his hay fever when he returns to his home in this city.

Dr. G. Melville Black—There is no doubt that Colorado is a good climate to mitigate hay fever, providing you go to the right part of Colorado. Such altitudes as Leadville, where there is no pollen from flowering plants, are at once productive of great relief to sufferers from hay fever. It has not been my observation that people are relieved from this trouble when they come to Denver. On the contrary, I have found that a great many people tell me that they never had hay fever until they came to Denver. Owing to the great dryness of our climate the mucous membranes of the nose are required to perform a far greater function than in climates where the humidity is greater. Unless the nose is a very normal organ, the possessor of it is sure to complain of what he terms "catarrh" before he has been here very long, hence an important causative factor has been added to his already predisposed economy to hay fever. We have as much hay fever here as any place on the face of the earth, excepting a few of the elevated mountain regions. I have had some success in the

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treatment of hay fever by improving the intra-nasal conditions by operative and local treatment, but I believe we must look to the uric acid diathesis as the predisposing cause, and the treatment of that condition will better reward us for our efforts than changing patients about from climate to climate.

SYPHILIS OF THE PHARYNX.

P. F. GILDEA, M. D., COLORADO SPRINGS.

This malady should be rare in new countries, and would be in Colorado, were it not for the fact that the diseased East, year after year, uses our all-healing atmosphere as a panacea for all its woes.

Thus it is that cases usually found only in worn-out centers of civilization are met with now and then at our mountain and prairie resorts, and many conditions generally ascribed to tuberculosis have a syphilitic basis.

The first case of obstinate ulcer of the pharynx I treated in Colorado Springs occurred in a young man twenty-four years old, of good physique, and good family history. His exposure to contagion took place one year before he came to me for sore throat. He claimed he had neither roseola nor chancre. There was a large ulcer on the right tonsil, and a smaller one on the soft palate near it. Both healed under iodine and iodoform paste locally in a week, but recurred in two weeks. I then put him on syr. ac. hydriodii, dr. i. t. i. d., and same local treatment; the small ulcer which had returned on the tonsil healed in four days, and he has had no return two years from date.

Cases second, third, and fourth are physicians, all of whom were inoculated by operative wounds on the thumb. One had chancre on top of thumb, characteristic roseola, and then developed pharyngeal symptoms which yielded to specific treatment.

Number two had chancre on thumb, no perceptible secondary symptoms, ulcer of left anterior pillar of fauces which yielded to mixed treatment.

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Number three had tuberculosis of both lungs before he became inoculated through a hangnail on the thumb; he had no symptoms other than those ascribed to his lung trouble until he came to me for symptoms of supposed tubercular pharyngitis and laryngitis. His was one of the most extensively ulcerated throats I have ever seen. There were oblong ulcers on the anterior surface of the soft palate, both sides of the median line; the one on the left side seemed to be continuous with a similar ulcer on the left tonsil. The arytenoids were oedematous and seemed to present a characteristic tubercular appearance; in fact, I was in doubt at first as to its real character. But iodide of potassium, and later proto-iodide of mercury, cleared away the ulceration in three weeks, and all the lung symptoms improved as if the syphilitic element had been taken out of his trouble, leaving only the tubercular. There has been no return of throat symptoms two months from time of cure.

The fourth case I mention because it is one of the reasons why I put nearly all cases of ulceration of the pharynx or larynx on small doses of iodide of potassium. A young woman thirty years of age, single, had lung trouble two years. Six months ago she developed a huskiness which gradually progressed to aphonia and difficulty of breathing, for which she came to me in January, 1896. I found cavity in left upper lobe, consolidation in right upper lobe, extreme emaciation, rapid and feeble pulse, temperature running to 102 in the evening. In the larynx both arytenoids were infiltrated, there was swelling in interarytenoid space, some inactive ulceration of right vocal chord near the cartilaginous portion, with a slight bulging of the area directly beneath both true bands. The most prominent symptoms produced were dysphagia and spasmodic dyspnoea at night.

About one week after I had first seen her, a membranous band connected the chords at the base, and her dyspnoea increased. She objected to any operation being performed, and I put her on the iodide of potassium, hoping to loosen the mucus and allow her to expectorate more freely. Her breathing improved from the first, and I was surprised to see the membrane disappear. The other conditions in the larynx re-

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mained also better until her death, which occurred from renal and cardiac complications. No autopsy was allowed.

Why that band—and I am positive it was a band, and not mucus—should have disappeared under the iodide of potassium I do not know. The fact remains, however, that the iodine seems to help ulcerations of the larynx and pharynx, whatever be their nature.

I do not wish to assert that all obstinate ulcers of the pharynx are syphilitic; but the tonic anti-syphilitic treatment is certainly justifiable, and often imperative, where these lesions do not yield readily to local applications.

To differentiate between syphilis and tuberculosis of the pharynx has been the aim of all teachers and clinicians; but up to the present moment it seems to be impossible to say definitely whether an ulcer occurring in a tuberculous subject is tubercular or syphilitic without resorting to history and treatment.

DISCUSSION.

Dr. Robert Levy—In reference to this topic, one of the most difficult conditions to contend with is the result of the ulcerations. The ravages produced by the ulceration and consequent cicatricial tissue that forms are sometimes so great that, as I have seen it, deglutition is greatly interfered with, the space between the pharynx and the lower pharynx or aesophageal opening being completely occluded. The forming of cicatricial bands goes on to such an extent as to encroach on the pharynx and the opening of the larynx, leading to fatal results from dyspnoea. Here we are at a loss; we cut up this cicatricial tissue; we dilate and dissect it; in spite of all, the cicatricial tissue continues to contract, and continues to disturb important functions. I have under observation at the present time a case which I presented to our county society some years ago. The patient comes to me regularly from New Mexico, at stated intervals, to have the cicatricial bands cut and dilated.

Dr. E. R. Axtell—I was interested in the case reported of syphilitic ulceration of the pharynx in a tubercular case. These are cases in which treatment is sometimes difficult to in-

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stitute—I mean where syphilis and tuberculosis occur in the same subject. I have found in these cases of mixed infection of tuberculosis and syphilis, that the patient is not susceptible to iodide of potassium and mercury, and many of them cannot take them in sufficient quantities to obtain relief. We are sometimes then at a loss to know what to do. Those that have had syphilis need mercurial treatment; and yet when we give it, the patient does not improve at all. There has lately been introduced cantharidine to overcome this trouble, and in small doses it acts well, and allows these patients to bear mercurial treatment.

Dr. Waxham—I would like to say a word regarding the differential diagnosis to which the doctor has only briefly alluded. It is very important indeed that we distinguish between syphilitic ulceration of the larynx and tubercular ulceration, and also between syphilis and carcinoma of the larynx. It is often very difficult to distinguish between a tubercular and syphilitic larynx. The appearances are often very similar, but it will very rarely happen that in tubercular ulceration of the larynx we will not find tubercular bacilli in the sputum. I have now a case in mind which it was very difficult to distinguish, and a differential diagnosis could only be made by examination of the sputum. As a rule, in cancer of the larynx we have more pain than in tubercular ulceration or in syphilitic ulceration. In syphilitic ulceration, and also in tubercular ulceration, we very rarely have much pain, except during deglutition, while in cancer there is sharp pain independent of deglutition.

FATAL HEMORRHAGE FROM THE NOSE AND PHARYNX, FROM UNUSUAL CAUSE; WITH EXHIBITION OF SPECIMEN.

ROBERT LEVY, M. D., DENVER, COLO.

The following case illustrates a source of hemorrhage, which, so far as the author knows, is in some respects entirely unique in otological and rhinological literature:

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H. W. C., aged 24, male, by occupation a miner, was admitted to the Arapahoe County Hospital, May 1, 1896. His family history was negative, his personal history unimportant.

At the Cripple Creek fire, April 24, during an explosion, he was struck on the left jaw, causing a severe hemorrhage from the nose. He was carried to the side of a hill where he lay for several hours, during which time the hemorrhage continued. He finally fainted, and does not know how long he remained in this condition. Upon admission to the hospital, a careful examination revealed no fracture of the jaw, but considerable contusion of the soft parts; his condition rapidly improved without especial treatment, and on May 4, was discharged at his own request. (Dr. A. H. Williams, house surgeon.) May 9, he was admitted to St. Luke's Hospital, very weak, anaemic, lips, conjunctivae and skin blanched. Since leaving Arapahoe County Hospital, he had had several serious hemorrhages from nose and pharynx. His posterior nares contained plugs which had been placed there two days previous to his entrance into St. Luke's Hospital. The plugs were allowed to remain until May 13, when on account of the pain, odor, and increased temperature—102 4-5—they were removed. He gradually improved, his temperature became normal, appetite returned, gained in flesh, etc. On May 24, he was allowed to dress and move about. After two days he began complaining of pain in the left ear and progressive deafness. The pain was at first localized at the floor of the meatus, but subsequently spread to the mastoid process and to the area immediately in front of the ear. His temperature gradually rose to 102 1-5. He was put to bed and examined by Dr. J. M. Foster, who found nothing abnormal in the appearance of the meatus, the external auditory canal, or membrana tympani. Several small hemorrhages from the nose occurred during this time, but were easily controlled by pressure and plugs of cotton in the anterior nares. On June 1 the pain ceased, the temperature fell to 99, and a small amount of discharge exuded from the ear. At 4 a. m., June 2, while turning in bed, the patient had a severe hemorrhage from the nose and throat. (Dr. S. Bell, house surgeon.)

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I was first notified of the case at this time, and ordered plugging with cotton saturated in peroxide of hydrogen. Upon my visit to the hospital a few hours later, I found the hemorrhage had ceased, but patient complained of large clots in naso-pharynx, which were continually being swallowed. The patient's appearance was that of one nearly exsanguinated. Absolute quiet was ordered; a nourishing liquid diet; strychnia and iron, and saline enemata. For several days the improvement was rapid, but the past history of the case warned us to be extremely cautious in allowing the patient to move about. In spite of the most stringent orders, the patient, who was an unruly one, managed surreptitiously to leave his bed on the morning of June 8. He walked a distance of fifteen or twenty feet, whereupon a violent hemorrhage took place. He immediately went into collapse, and died the same day at 9:25 p. m. An autopsy, held by Dr. Axtell, revealed the following:

"No blood in the meningeal vessels; dura mater not adherent; a small, long white clot in the superior longitudinal sinus, but no thrombus; in the middle fossa, at the suture of the temporal and sphenoid bones, posterior to the foramen ovale, there showed through the meninges from above, a discolored area the size of a half cent. On reflecting the membrane at this point, there was found a small collection of grayish brown, purulent disorganized material at the opening of and filling the foramen spinosum, which opening seemed larger than normal, and irregular in outline. A probe was introduced and passed forward, downward, and to the right, and was felt by the finger in the mouth to touch the upper part of the soft palate."

The course of the probe was evidently through the Eustachian tube, the septum between the foramen spinosum and Eustachian tube having been destroyed. Further examination revealed the existence of a purulent otitis media, involving to a slight degree the mastoid antrum, the roof of the middle ear, and extending forward to the anterior portion of the petrous bone. Necrosis in this course had taken place, the process continuing into the foramen spinosum, and from there into the Eustachian tube. The middle meningeal artery, which passes through the foramen spinosum, had been eroded to such

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an extent that where the opening communicating with the Eustachian tube was discovered the vessel seemed completely disorganized. The source of the hemorrhage was therefore clearly from the middle meningeal artery, through the Eustachian tube into the naso-pharynx. The membrana tympani not having been ruptured explains why there was no hemorrhage from the external auditory canal.

It is interesting to consider the cause of the suppurative otitis, in view of the traumatism which was associated with violent hemorrhage, and in view of subsequent developments. Whether the disease was of long standing, the final perforation of the artery taking place coincidently with the severe blow, or whether the original hemorrhage was from a different source, the otitis suppurativa being the result of the plugging of the posterior nares, must remain a matter for conjecture.

It is not for the purpose of discussing this interesting question that the above case is here reported, but rather for the purpose of placing upon record a case of great rarity.

Fatal hemorrhage from suppurative otitis media, followed by necrosis and perforation of the internal carotid, is not frequent. Politzer, however, has collected nineteen cases. But hemorrhage from the middle meningeal occurring in the course of otitis suppurativa, and in the manner illustrated by this case, must be of the extremest rarity.

DIRECT AUTOSCOPY—KIRSTEIN; WITH DEMONSTRATION.

ROBERT LEVY, M. D., DENVER, COLO.

I will take but a short time to show you the direct method of examining the larynx by means of what is known as the method of Kirstein. I regret that the patient suffering from laryngeal papillomata has not presented himself, and as a consequence I wish simply to show you the use of the instrument

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known as the autoscope, and the larynx of a patient who is easily examined by this method.

The autoscope is an instrument consisting of a handle upon which is placed a hood and to which are attached cables connecting with a ten-volt battery. In the hood is an electric light of eight or ten candle power, which is concentrated by a small bull's-eye upon a mirror. This mirror is so placed as to reflect a light through a slit in the hood, and upon a long grooved tongue depressor. The tongue depressor is so introduced into the patient's pharynx as to illuminate to a distance below the vocal bands, and even to the first bronchi. The object of this method is to do away with the laryngeal mirror; but this object has not as yet been accomplished. The great disadvantage of this means of examination is the difficulty that the patients find in allowing the instrument to be passed far enough for a successful examination. Some patients are more easily manipulated than others, and in the majority of instances it is necessary to anaesthetize the throat with a solution of cocaine.

The photographs which are here presented show the patient in two positions in which the examination may be conducted; one position is that of the patient lying upon a table with his head thrown well downward over the edge; the other position is that of the patient sitting erect, his head thrown back, the operator standing behind. A much simpler and more comfortable position is that in which the patient sits erect in a chair, his body inclined slightly forward, his neck well extended, the operator standing in front. Whatever position may be assumed, the principle is simply that of bringing the mouth in as near a straight line with the larynx and trachea as possible, much as is done in the sword swallower's act.

Autoscopy is applied in three positions, viz.:

First—The simple examination of the pharynx, which is similar to ordinary pharyngoscopy, by means of the common tongue depressor.

Second—By slightly raising the handle of the instrument and slipping the tongue depressor as far backwards as the base of the tongue, the anterior surface of the epiglottis, together with the adjacent regions, is seen.

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Third—The examination of the interior of the larynx and trachea; this is the most important as well as difficult portion of the examination. It is necessary in order to accomplish the third position that the handle be well raised, the instrument gradually slipped well into the glosso-epiglottic space, and firm pressure made downward and forward. The epiglottis is thus raised and the interior of the larynx with more or less of the structures below brought into view. At times this is not accomplished so easily, on account of the failure to raise the epiglottis sufficiently. In these instances, it is not difficult to pass the end of the tongue depressor over the epiglottis, drawing it well forward by gentle pressure upon its under surface.

(Demonstration upon the patient.)

In regard to the practicability of this instrument, it is true this is as yet very limited. However, there are certain conditions which can undoubtedly be more successfully treated under the guidance of this method of examination.

Intra-laryngeal operations upon children are with great difficulty performed with the laryngoscope, either under general anaesthesia or local.

Von Bruns* has recently operated on two cases of laryngeal papilloma in children by placing them under complete anaesthesia, and then using Kirstein's autoscope. We can readily appreciate the ease with which this method is applied during anaesthesia as compared with its use in children under simple applications of cocaine. It is easy, also, to appreciate the advantages in such instances of this method over the almost impossible examination by the laryngoscope.

REPORT OF FIVE HUNDRED CASES OF INTUBATION OF THE LARYNX.

F. E. WAXHAM, M. D., DENVER, COLO.

It has been my pleasure to have reported to this society, on a previous occasion, 466 cases of intubation. To this number I can now add thirty-seven, making a total of 503 cases.

* Centralblatt für Kinderheilkunde.

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Of these thirty-seven cases, there were seventeen recoveries, or 46.64 per cent. Many of these cases were beyond all hope when the operation was performed. Several were complicated with scarlet fever and some with measles, and in these cases the operation was simply performed for euthanasia, much to the detriment of a good record. In nine cases antitoxin was administered, with six recoveries, or 66.66 per cent.

In order to complete the record, I desire to publish the following cases:

Case 467—Courtesy Drs. A. A. Clough and L. M. Walker. Diphtheria of pharynx and larynx. Age six years. Wore tube seven days. Complete recovery.

Case 468—Courtesy Dr. W. E. Wilson. Diphtheria of nasal cavities, pharynx, and larynx. Age eighteen months. Patient died within thirty-six hours.

Case 469—Courtesy Dr. A. A. Clough. A case of malignant diphtheria, with larynx involved. Great relief from dyspnoea afforded by the operation, but patient died within twenty-four hours from exhaustion. Age seven years.

Case 470—Courtesy Dr. P. V. Carlin. Semi-malignant diphtheria of nasal cavities, pharynx and larynx. Patient died three days after the operation from exhaustion. Age three years.

Case 471—Courtesy Drs. E. J. A. Rogers and W. E. Shotwell. The case was considered to be one of membranous croup, as no membrane was visible in nasal cavities or pharynx. Patient wore tube nine days, making a good recovery. Age three years. Other children in the family developed pharyngeal diphtheria.

Case 427—Courtesy Dr. P. V. Carlin. Patient died on third day after operation from extension of membrane to the finer bronchi. Age four years.

Case 473—Courtesy Dr. P. V. Carlin. Diphtheria of nasal cavities, pharynx, and larynx. Wore tube ten days. Complete recovery. Age sixteen months.

Case 474—Courtesy Dr. Charlotte Hawk. Patient dying from suffocation when operation was performed. Wore the tube four days. Perfect recovery. Age twenty months.

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Case 475—Courtesy Dr. C. B. Richmond. A case of laryngeal obstruction complicating measles. Operation gave relief to the urgent dyspnoea, but patient died from exhaustion within twenty-four hours. Age twenty months.

Case 476—Courtesy Dr. W. E. Shotwell. A case of laryngeal diphtheria. Operation gave relief for twenty-four hours, when obstruction occurred below the tube, which could not be expelled on removal of the tube. Tracheotomy was done, and a membranous cast of trachea and larger bronchial tubes was removed. Patient died forty-eight hours later from bronchial obstruction due to the reformation and extension of the membrane. Age thirteen years.

Case 477—Courtesy Drs. W. E. Davis and A. A. Clough. Diphtheria of pharynx and larynx. Wore tube four days. Uneventful recovery. Age three years.

Case 478—Courtesy Dr. P. V. Carlin. A bad case of diphtheria involving the larynx. Wore tube ten days before it could be dispensed with. General paralysis occurred, involving muscles of throat. Necessary to feed through stomach tube. Slow but complete recovery. Age three years.

Case 479—Courtesy Dr. W. E. Wilson. Operation gave relief, but patient died twenty-four hours later from extension of membrane. Age five years.

Case 480—Courtesy Dr. E. R. Axtell and Dr. Mary Brown. Operation gave relief for forty-eight hours, when obstruction occurred below the tube. The tube was removed, but the patient was unable to expel the offending membrane and immediately became asphyxiated. Tracheotomy was quickly done after respiration had ceased, and the patient resuscitated. A membranous cast of trachea and bronchial tubes was removed. The case did well for thirty-six hours, when the reformation and extension of the membrane occurred, and the patient died. Age five years.

Case 481—Courtesy Dr. S. H. Wood. A case of malignant diphtheria, terminating fatally twenty-four hours after operation. Age three years.

Case 482—Courtesy Dr. S. H. Wood. A sister of the previous case. Malignant and fatal within twenty-four hours. Age four years.

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Case 483—Courtesy Dr. J. Sol. Smith. Diphtheritic case. Wore tube four days. Recovery. Age four years.

Case 484—Courtesy Dr. Miles. Wore tube five days. Recovery. Age three years.

Case 485—Courtesy Drs. Ida N. Beaver and Alicia F. Jeffery. Diphtheritic. Died three days after operation from extension of membrane to finer bronchi. Age eleven months.

Case 486—Drs. Parkhill and Blickensderfer. Wore tube five days. Uneventful recovery. Age eight years.

Case 487—Courtesy Dr. J. B. Devlin. A diphtheritic case. Prompt relief was given, but case terminated fatally within thirty-six hours from extension of membrane. Age twelve years.

Case 488—Courtesy Drs. L. P. Durbin and T. H. Hawkins. The case was one of oedema of the larynx, associated with very sever form of scarlet fever. The patient died from oedema of the lungs within twenty-four hours after the operation. Age seventeen years.

Case 489—Courtesy Dr. ————. A case of scarlet fever, attended with laryngeal obstruction. The case was hopeless when operated upon, and died within twenty-four hours. Age three years.

Case 490—Courtesy Dr. George G. Baker and Dr. Joseph McKee. Wore the tube six days. Uneventful recovery. Age five years.

Case 491—Courtesy Dr. L. T. Durbin. Wore tube six days. Antitoxin administered. Good recovery, although slow. A secondary attack of pharyngeal diphtheria occurring within three weeks. Age three years.

Case 492—Courtesy Dr. Joseph McKee. Wore the tube nine days, making a good recovery. Age seven years.

Case 493—Courtesy Dr. Crocker, of Littleton, Colorado. Patient very low with laryngeal obstruction, complicating scarlet fever. There was but little relief from the operation, and the child died within a few hours. Age two and one-half years.

Case 494—Courtesy Dr. Joseph McKee. The patient was very feeble, and died within thirty-six hours. Age three years.

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Case 495—Courtesy Dr. W. P. Munn. Antitoxin used. Patient nearly moribund from asphixiation. Wore tube four days. Recovery.

Case 496—Courtesy Dr. B. F. Stockett. Patient died within twenty-four hours after the operation. Age three years.

Case 497—Courtesy Dr. A. M. Bucknum. Diphtheritic case. Patient greatly exhausted from difficulty of respiration. Antitoxin employed. Wore tube five days. Good recovery. Age two years.

Case 498—Courtesy Dr. J. W. Hawk. Wore tube nine days before it could be dispensed with. Antitoxin used. Recovery. Age three years.

Case 499—Courtesy Dr. David Thompson. A very bad diphtheritic case. Patient nearly dead, and lower trachea and bronchial tubes already invaded. Intubation gave no relief on account of obstruction in trachea and bronchial tubes which could not be expelled. Tracheotomy performed, and patient died within twenty-four hours. Age two years.

Case 500—Courtesy Dr. David Thompson. A bad diphtheritic case, nose, throat and larynx being involved. Four other bad cases of diphtheria in the family. Antitoxin used. Wore tube five days. Recovery. Age two years.

Case 501—Courtesy Dr. C. B. Richmond. A case of pharyngeal and laryngeal diphtheria, and patient greatly exhausted from long continued dyspnoea. Antitoxin used. Wore tube five days. Recovery. Age three years.

Case 502—Courtesy Dr. E. H. Fish. A case of laryngeal diphtheria, no membrane being visible in pharynx. Child suffering from intense dyspnoea. Case terminated fatally within thirty-six hours from extension of membrane. Age seven years.

Case 503—Courtesy Dr. A. K. Worthington. The patient did well for four days, when the tube was removed. Within a few hours the stenosis returned, and before reaching the patient, death had occurred from suffocation. Antitoxin used. Age three years.

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In conclusion: Arranging these cases in series of one hundred consecutive cases, the record of my cases to date is as follows:

FIRST ONE HUNDRED CASES.

Age.	No. Cases.	Recoveries.	Percentage.
Under 1 year.	5	1	20.00
1 year.	13	2	15.38
2 years.	22	4	18.18
3 years.	17	2	17.76
4 years.	15	7	46.66
5 years.	9	3	33.33
6 years.	5	2	40.00
7 years.	8	2	25.00
8 years.	4	3	75.00
9 years.	1	1	100.00
10 years.	1	0	00.00
	100	27	27.00

SECOND ONE HUNDRED CASES.

Age.	No. Cases.	Recoveries.	Percentage.
1 year.	17	5	29.41
2 years.	15	2	13.33
3 years.	14	4	28.56
4 years.	22	7	31.81
5 years.	9	6	66.66
6 years.	8	3	37.50
7 years.	6	4	66.66
8 years.	1	1	100.00
9 years.	3	2	66.60
10 years.	1	0	00.00
12 years.	2	0	00.00
13 years.	0	0	00.00
14 years.	0	0	00.00
	100	34	34.00

THIRD ONE HUNDRED CASES.

Age.	No. Cases.	Recoveries.	Percentage.
Under 1 year.	5	2	40.00
1 year.	11	2	18.18
2 years.	13	5	38.46
3 years.	19	11	57.72
4 years.	22	9	40.90
5 years.	10	5	50.00

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THIRD ONE HUNDRED CASES.—Continued.

Age.	No. Cases.	Recoveries.	Percentage.
6 years.	7	1	14.28
7 years.	6	3	50.00
8 years.	2	0	00.00
9 years.	2	0	00.00
10 years.	1	1	100.00
20 years.	1	0	00.00
43 years.	1	1	100.00
	100	40	40.00

FOURTH ONE HUNDRED CASES.

Age.	No. Cases.	Recoveries.	Percentage.
Under 1 year.	2	1	50.00
1 year.	11	3	27.27
2 years.	20	7	35.00
3 years.	19	10	52.63
4 years.	20	7	35.00
5 years.	11	4	36.36
6 years.	5	1	20.00
7 years.	5	1	20.00
8 years.	3	2	66.66
10 years.	2	1	50.00
11 years.	1	1	100.00
60 years.	1	0	00.00
	100	38	38.00

LAST ONE HUNDRED AND THREE CASES.

Age.	No. Cases.	Recoveries.	Percentage.
Under 1 year.	2	0	00.00
1 year.	14	3	21.42
2 years.	16	10	62.50
3 years.	29	11	37.93
4 years.	14	6	42.85
5 years.	7	2	28.56
6 years.	2	1	50.00
7 years.	7	1	14.28
8 years.	4	3	75.00
9 years.	1	0	00.00
10 years.	2	1	50.00
12 years.	2	0	00.00
13 years.	1	0	00.00
17 years.	1	0	00.00
36 years.	1	1	100.00
	103	39	38.83

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TOTAL NUMBER OF CASES.

Age.	No. Cases.	Recoveries.	Percentage.
Under 1 year.	15	4	26.66
1 year.	76	16	21.05
2 years.	97	35	36.08
3 years.	114	43	37.89
4 years.	104	41	39.42
5 years.	50	21	42.00
6 years.	28	8	28.57
7 years.	36	11	30.55
8 years.	17	11	64.70
9 years.	8	3	37.50
10 years.	9	4	33.33
11 years.	1	1	100.00
12 years.	5	0	00.00
13 years.	2	0	00.00
14 years.	1	0	00.00
17 years.	1	0	00.00
20 years.	1	0	00.00
36 years.	1	1	100.00
43 years.	1	0	00.00
60 years.	1	0	00.00
	503	178	35.38

I cannot close this paper without emphasizing the importance of the use of antitoxin in cases of laryngeal diphtheria. I am fully convinced that antitoxin limits the extension of diphtheritic exudation as does no other remedy that we possess; and as the danger lies chiefly in the extension of this membrane, it is apparent that the remedy should be employed early, before the membrane has extended to the lower trachea and to the bronchial tubes. In a case of diphtheria, the very moment that it is evident (from the slightly embarrassed respiration and the croupy cough) that the larynx has become invaded, the remedy should be used. By the early use of antitoxin in these cases, not only will many operations be avoided, but many cases requiring operation will be saved that would otherwise perish. In corroboration of this statement, I would say that since the general use of this remedy in Denver, I have been called much less frequently by my *confreres* to operate than formerly, and in those cases operated upon, a much larger percentage have been saved.

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DISCUSSION.

Dr. Charles Denison—I think this is a matter that we can congratulate ourselves upon, that we have had among us a physician who has had such large experience in this operation. I do not myself know of any one physician who has had such large experience in the United States—that is, so large a collection of operations of his own—with the ratio of recoveries, considering how many of them are so serious and unpromising. If there is any operation or any service which a physician can render which verily entitles him to the credit of saving life, it is, in my judgment, that of intubation. Of course, we give much the same credit to the operation of tracheotomy; but in intubation the fact is to be recognized that any operation is often put off and not performed, and then allowed to be performed by intubation, which would not be the case with tracheotomy. . . . It is a last resort, and as such, is often practiced when the case is actually hopeless. I recall to my mind one case where Dr. Clough asked me to assist him when death was positive; in fact the child was already dead—and I want to relate this case. The mother had seen the child gasp; and she was excited and lost her head. She dropped the child on the bed and ran out, and I said to the doctor, "Let us try it, anyway." He held the child, and it was impossible, no one being there to help us, to hold the head right. The tube went into the aesophagus, I believe, and the child gasped again just at that time. I said, "He is gone; put him down on the bed." He laid him on the bed, the gag came out of his mouth, and the chin dropped. I said, "I will try it, anyway;" it was so easy to put my finger in the open mouth as he lay there on the bed. I put the tube in, and through artificial means started the child breathing again. In half an hour that child was sitting up drinking a glass of warm milk. Nevertheless, I told Dr. Clough that the child would be dead in twenty-four hours. I will tell you my reason for thinking so, and how I studied out this conclusion. It is a matter of pressure of the air in the lungs, where, if a child has gone so far, there is always danger of complication from aspiration pneumonia. The fluid from the blood is sucked into the air cells,

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as well as the air, and you have here an aspiration of the blood, and an oedema started, which is sure to result fatally. It has been my experience and my judgment in these cases that a child three and a half years old is a very good age for operation, as you see by Dr. Waxham's cases. This was a favorable case. The aspiration pneumonia was in due time to develop. In spite of all we did the child died in sixteen hours. This aspiration pneumonia seems to me a very important matter to consider in connection with intubation. As Dr. O'Dwyer's collection of cases show, fifty-one per cent. of the cases of intubation which resulted in death could be counted as those who died from catarrhal pneumonia, bronchitis, and what he calls aspiration pneumonia. Eliminating that fifty-one per cent., and the operation of intubation is a most wonderful one in the way of saving life. The great desideratum is to operate early enough; and I wish to call to mind the importance to the general profession of this fact, which I believe I am responsible for: The coming on of aspiration pneumonia is indicated by the tension of the pulse, and in a child which is not so young but what you can get the tension of the pulse you will get instruction. A weakening pulse during inspiration and increased tension of the pulse at the wrist during expiration, shows the amount of obstruction to the extrance of air through the trachea. In three cases of this character I believe they got well because I operated early; I would like it if others would carry out the same observation. If you can get ahead of this aspiration pneumonia you shut off fifty-one per cent., nearly, of your chances of failure. I have only one other point to mention—that is, my results have been very satisfactory to me. I have had thirty-four operations and fourteen recoveries, which is a little less than forty per cent. The last case is the only one where I at the same time used the diphtheria antitoxin, though I am entirely in accord with Dr. Waxham's conclusions as to the more favorable effect of intubation with it than without it.

Dr. Bond Stowe—I wish to report in this connection a case of intubation, which I had in the city of Chicago, in which the tube remained in the child twenty-eight successive days,

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ending in recovery. During these twenty-eight successive days I extracted the tube five times, but found it necessary to reinsert it immediately, within five minutes, because of the choking, dyspnoea, etc., with which you are all so familiar, returning. At the end of twenty-eight successive days, with these five successive intubations, having removed the tube, I found the child was able to get along without the tube, and thence made a successful recovery. I state this case simply to demonstrate that where you have performed intubation and the tube is extracted, and the dangerous symptoms return, you are not to draw the conclusion that it is useless. The tube, in my estimation, should be reinserted, provided it is a case purely for intubation and not one where tracheotomy should be performed. I think the great source of error in regard to the statistics in reference to intubation lies in not having a clear and definite diagnosis as to when intubation should be performed, and when not to be performed. When the inflammation of the trachea exists below where your tube can reach, intubation is useless; when it exists above the larynx, for instance when the tonsils or the soft palate are unusually swollen, to insert the tube is valuless, for the tonsils simply close over the top of your tube and you accomplish nothing; so that it is clear, a distinct diagnosis as to whether intubation or tracheotomy should be performed is absolutely requisite. The case I have reported simply shows to my mind what persistent efforts on the part of a conscientious physician will do for a case, even though the case seems almost hopeless. I do not know whether there is recorded a case of true laryngeal diphtheria—perhaps Dr. Waxham, a man who has had a great many years of experience in intubation, can inform us—in which the tube has remained in the throat longer or as long as twenty-eight successive days.

Dr. H. R. Bull—I was very glad to hear the points brought out by Dr. Denison on pneumonia which follows intubation. I think I know why a certain case of mine died. In regard to the use of antitoxin in these cases of laryngeal diphtheria, I had an experience about three months ago in which I had a case of laryngeal diphtheria, and where I used antitoxin, and was obliged to intubate about twelve hours after using the

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remedy. I left the tube in forty-eight hours. I removed it, and dyspnoea soon become again a marked symptom. I gave the little patient, a boy eight years old, a second large injection of antitoxin, but within twenty-four hours after I had removed the tube there were such urgent symptoms again that I was obliged to reintubate, leaving the tube in the second time for twenty-four hours, when I removed it, and the boy made an uninterrupted recovery. I question whether I had received any benefit from the antitoxin in that case or not. It occurred to me possibly that it might have been a case of what we term mixed infection—that is, the membrane of the throat was not entirely due to the diphtheritic membrane caused by the Klebs-Loeffler bacillus.

Dr. F. E. Waxham—I can hardly agree with the first speaker wherein he states that a case is hopeless where the patient has become unconscious, on account of the tendency to aspiration pneumonia. I have operated a great many times upon patients when entirely unconscious and moribund. I have operated upon cases, in fact, where respiration had ceased—have resuscitated them by artificial respiration, and they have recovered and are living to-day. I can recall at least a dozen of these cases where recovery has occurred, where the patient was found unconscious and pulseless at the wrist, when the operation was done, although of course the prognosis is far more unfavorable under these circumstances than when the operation is performed earlier.

In reply to the second speaker, I will say that my patients have worn the tubes all the way from one hour to three years. The shortest time that the tube has been worn was one hour. In this case the child was dying from suffocation, and the operation was performed with great relief; within an hour the tube was expelled, together with a membranous cast of the trachea. Upon being called in to see the case, I found the child breathing well, and found it entirely unnecessary to reintroduce the tube; the child made a complete recovery. This is the shortest time that I have had the tube worn. The longest case was one of three years; this, however, was not a case of diphtheria, but papilloma of the larynx. The longest

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period of time in my experience in which a tube has been worn in a case of diphtheria has been three weeks. I have had a number of cases that have worn the tube for this period of time, before they could do without it.

PUERPERAL ECLAMPSIA, WITH REPORT OF A CASE AND TREATMENT.

NORMAN W. BELLROSE, M. D.

I doubt very much if there is a disease of pregnancy in which there is a greater diversity of opinion as to its etiology and pathology than puerperal eclampsia. Do we know its cause? Yes, I think we do.

Braun tells us that the kidneys are responsible, and is an advocate of the nephritic origin. Playfair, on the other hand, does not consider the albuminuric theory as clearly proven. Lever, in 1843, pointed out the connection between albuminuria and eclampsia, and that the two conditions occupied the relative position of cause and effect.

Further investigations, however, lead one to believe that the kidneys are not wholly responsible. In twenty-eight cases of eclampsia reported by Schauta, three were found to have normal kidneys. Ahlfeld found in seventeen cases two in which the kidneys were normal.

Vinay, after making thorough microscopic examination, states that in a large number of cases the disease can hardly be attributed to renal lesion. Rivere, Auvard and others declare eclampsia to be a form of auto-intoxication. I believe that the theory of toxemia—not one, but several different poisons—is generally upheld. I am a firm believer in the toxemia theory of Rivere and Auvard; but, nevertheless, I cannot but believe that the kidneys play an important part in the toxemia of eclampsia.

Bouchard has said that man is constantly menaced by poisoning. He labors each instant for his own destruction,

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making incessant attempts at suicide, nevertheless this intoxication is not realized, for the organism has multiple resources to escape it.

It is not necessary for me to tell you that in pregnancy the composition of the blood is profoundly altered, and that the quantity is somewhat increased. Why is this? Because the quantity of blood present before pregnancy is inadequate to meet the condition of pregnancy. We know the pregnant woman has to provide nutriment to breathe, to maintain blood circulation, to secrete and excrete for two individuals—herself and her foetus. All this means that extensive changes in the general system must occur. In order to carry on this extra work properly, certain viscera of the circulatory apparatus becomes somewhat modified in size and in function. I might mention the heart, the hypertrophy of which is a wise provision of nature to meet the increasing demands of the blood supply in the advancing months of pregnancy. Other organs are likewise increased in size—namely, the liver, spleen and kidneys. The lungs and skin also become more active. Why is this change? My answer is, nature has an increased amount of work to do, and such being the case, she endeavors to increase the working capacity of her organs accordingly. It is my belief that in eclamptic cases the kidneys (possibly the liver, lungs and skin) fail to accommodate themselves to the extra work that the pregnant state requires of them. You are aware that the kidneys excrete largely of the solid constituents of the blood, and that many of the inorganic salts of the urine are elaborated in the kidneys. Toxic substances in the blood, whether generated within the body or derived from without, are in a great measure eliminated by the urinary organs. In pregnancy the need of this elimination is necessarily greatly increased, or should be. If the kidneys fail to do this extra amount of work, accumulation is produced and intoxication results. At first this is hardly noticeable; but as pregnancy advances and the amount of toxic matter to be eliminated is increased in the blood, the greater the effect of the poisons on the great nerve centers, and as a result, other symptoms develop that are characteristic of eclampsia.

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Some writers state that eclampsia is the result of albuminuria which is caused by intra-abdominal pressure, thereby interfering with the renal circulation. If this be true, why is it that a non-pregnant woman can have her abdomen as greatly distended by an ovarian tumor as from plural pregnancy at term, and yet not suffer from either? Statistics tell us that one in three hundred women who bear children suffer from eclampsia, and that about twenty-five per cent. of them die. I can say that I have had two cases out of a record of two hundred and fifty pregnancys. I take pleasure in making report of one of them. I can say, however, that both of my cases made a good recovery.

Case 1—Mrs. A. Primipera, 23 years of age, pregnant about 265 days. She enjoyed fairly good health up to within about fifteen days of full term, having had only light attacks of headache from time to time, with some stomach symptoms. On April 16, 1893, she first noticed that her feet were somewhat swollen. On April 18, about 3 p. m., she was taken with a severe headache, which got gradually worse until about 8 p. m. At this time it was almost impossible to endure. Not suspecting anything serious, both she and her husband thought it would "wear off" after getting some sleep. She failed in doing so, and at 10 p. m. the pain in the head was no better. I was called about 11 p. m.; arrived fifteen minutes later. I found my patient in a very restless condition; the pulse was tense and about ninety-five to one hundred beats per minute; some nausea and vomiting. The quantity of urine voided during the preceding twenty-four hours was thought to have been about two and one-half pints. About one-half hour after my arrival she had a severe convulsion (epileptic in character), which lasted about five minutes. It was followed by more or less stupor. She would answer all questions rationally but slowly. I at once gave a five-grain powder of phenacetine combined with one-eighth grain of morphia sulphate, which relieved the head and nervous symptoms for a short time. Her family physician, Dr. J. Hawes, of Greeley, Colorado, was then sent for; he being out of town, Dr. Wallace was called. He arrived about 2:30 a. m. on the 19th. There wasn't any question about diagnosis. Fluid extract of veratrum viride

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was given hypodermically, in two-drop doses, repeated every hour, and was gradually increased one drop at a time until ten drops had been given. Dr. Wallace remained until 3:30 a. m., and at Mr. A's request I took charge of the case. At 4 a. m. she had a second convulsion which was of longer duration and more severe in character. The face became more congested. She then went into a profound coma, and did not recover consciousness until 10 p. m. April 21. After the second attack I immediately began giving hydrate of chloral and potassium bromide, of each thirty grains, in four ounces of warm water, per rectum, and repeated every three hours. The convulsions continued in spite of treatment, and by 10 a. m. April 19 she had had seventeen. Eight o'clock next morning (April 19) I decided that the best thing to do was to empty the uterus, and the sooner the better for the safety of the mother and the child. Dr. Wallace was again sent for; he not having arrived at 10 o'clock, I proceeded to prepare the patient and myself for the operation, which was conducted under strictly antiseptic conditions. Squibb's chloroform was administered, more for the purpose of controlling the convulsions than pain, as the patient seemed to be insensible to pain. A soft rubber catheter was then passed into the blader and about a pint of dark colored urine was obtained which contained about one-fourth in volume of albumen. Dr. Wallace had not arrived at 10:30, so decided to operate at once with what assistance the nurse could render. The manipulations necessary in dilating the oss excited uterine contraction and by the time I had sufficiently dilated to admit the hand, the child's head had descended and version was impossible. Forceps were applied, and at 11:45 I succeeded in delivering a nine-pound boy. Life was extinct, however. I labored with it for some time, but without success. The placenta was removed by Crede's method with very little difficulty. Port partum hemorrhage was very slight.

The veratrum viride was then continued in nine-drop doses hypodermically every two hours, as was also the hydrate of chloral and potassium bromide every three hours. Rectal enemas of peptonized milk were given every four hours. I also used dry cupping and sinapisms over the kidneys. As

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soon as the patient could swallow, a thirty-grain powder of compound jalup powder was given in a little water to open up the bowels, and a saline laxative given daily to keep up a free action. After consciousness was restored the hydrate of chloral and potassium bromide were discontinued, and potassium acetate with infusion of digitalis was given instead to keep up a free action of the kidneys. The usual diet and tonics were then given. Up to 10 p. m. April 21, she had had twenty-seven convulsions, making seventeen before the operation and ten thereafter. The albumen disappeared from the urine in about ten days. Diplopia was complained of from the fourth to the seventh day. My patient sat up in bed on the tenth day, and on the fourteenth day was dressed. She made a good recovery.

Wilson, Hammond and others, tell us that the eclampsia of pregnancy is caused by the presence of an excess of urea in the blood. How can this be, when Bouchard tells us that to kill a man would require the quantity of urea which he makes in sixteen days? Clinical observation is therefore here in accordance with experimentation in denying to urea the power of producing the intoxication called uremic.

It seems to me that if the nephritic theory of eclampsia is correct, as many writers claim, the kidneys would not have cleared up as quickly in this case. I do not think that the nephritic symptoms were in proportion to the gravity of the eclamptic manifestations. In closing I wish to state that I think it is a mistake not to induce premature delivery when the child is viable in eclamptic cases that do not respond to treatment after a fair trial. I firmly believe that in Mrs. A's case the child's life might have been saved if delivered after the third or fourth convulsion.

CLOUDY URINE.

E. C. HILL, M. D., DENVER, COLO.

The presence of an unorganized sediment in urine signifies as a rule merely a change in temperature or chemical reaction, owing to which the solvent power of the fluid for the substance

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precipitated is diminished or nullified. The presence of such a sediment bears no relation whatever to the amount of the ingredient in the urine. With the exception of the slight cloud of mucus seen normally in cooled urine, organized urinary deposits are always pathological. On the whole, however, cloudy urine is a less serious indication than is a very clear renal excretion, such as we see in diabetes mellitus and chronic Bright's disease.

For the accurate study of urinary sediments the microscope is an absolute essential. A centrifugal machine for the rapid settling of casts and other suspended matters must be considered a necessary adjunct to the microscope. By the aid of the centrifuge we gain not only more delicate results but more correct as well, since the urine can thus be examined in a perfectly fresh condition before any chemical decomposition takes place with precipitation of uric acid, calcium oxalate, the earthy phosphates, and other sediments resulting from acid or alkaline fermentation.

Urates—This, by far the most common of urinary deposits, consists ordinarily of the mixed acid urates of sodium and potassium, which are much less soluble than the corresponding neutral urates, from which the former salts are produced in acid urine of high density. The mixed acid urates vary in color from a light pink to a deep red. They are much more soluble in warm than in cold water and are hence often thrown out of solution as the well known "brick dust" deposit on cold winter nights. Calcium urate is of rare occurrence as a urinary sediment, appearing as a light gray amorphous powder. Like sodium and potassium urates, it is found as a deposit only in urine of acid reaction. Ammonium urate is observed in decomposing alkaline urine in connection with the so-called triple phosphates, as a whitish granular sediment. The distinctive chemical test for all forms of urate deposits is the clearing up with heat, at a temperature below the coagulation point of albumin. Under the microscope the acid urates of sodium and potassium are usually amorphous, and pinkish in hue. They are rarely seen as fan-shaped and circular radiating crystals of a reddish-brown or yellowish tint. Ammonium

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urate often occurs in the form of little brown balls with spicules, the so-called "hedgehog" crystals."

Uric Acid—This is a very insoluble substance, and is normally present in the urine in the form of the neutral or acid urates. From these salts uric acid is precipitated by an increase of acidity, particularly when the urine is of low specific gravity and deficient in pigment. To the naked eye uric acid appears as a crystalline sediment resembling grains of red sand or of cayenne pepper. Under the microscope these granules appear as large and beautiful crystals of various forms, the lozenge-shaped predominating. The crystals are frequently arranged in a superimposed manner into rosettes and other composite combinations. Uric acid crystals are readily distinguished from any other (except urates and cystin) by their lemon-yellow or reddish-brown color.

Phosphates—The earthy phosphates (calcium and magnesium) constitute the most common sediment in urine of alkaline reaction. They are usually soluble in acetic acid, being in this way discriminated from other urinary deposits. The color of a phosphatic sediment is usually gray; in the presence of hemoglobin it has a reddish tinge. Under the microscope the earthy phosphates commonly appear granular and amorphous. That of calcium sometimes observed in feebly acid urine is crystalline and wedge-shaped or conical, the crystals being often grouped in a radiating manner point to point. The so-called "triple" phosphate of ammonium and magnesium is seen normally in urine which has undergone ammoniacal fermentation outside of the body. When present in freshly passed urine such a deposit is always pathological, indicating ammoniacal decomposition within the bladder as both a result and a cause of cystitis. The crystals of the "triple" phosphate are relatively large and colorless, having the form ordinarily of a triangular prism with beveled ends; hence the name of "coffin-lid" crystals.

Calcium Oxalate—This is rather a common sediment, often mistaken microscopically for a cloud of mucus. It is found in both acid and alkaline urine, especially after the patient has eaten freely of rhubarb, tomatoes and other vegeta-

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bles rich in oxalic acid. Calcium oxalate crystals are usually octahedral in shape, giving the appearance of a square crossed by two diagonal bright lines, like the back of a square envelope. These crystals are much smaller than those of the triple phosphate, from which they are further distinguished by their insolubility in acetic acid. A much rarer form of calcium oxalate crystals is that resembling a dumb-bell.

Hippuric Acid—I have occasionally met with this compound as a urinary sediment, in the form microscopically of fine needles or of four-sided rhombic prisms with beveled ends and edges. A deposit of hippuric acid is met with most frequently after the ingestion of benzoic acid or of certain aromatic vegetables—cranberries, for instance.

Calcium Sulphate—This is a very rare sediment, occuring only in acid urine of high specific gravity. The crystals are radiating colorless needles.

Calcium Carbonate—This is also an exceedingly rare deposit in the human renal excretion. It is found only in alkaline urine as a whitish deposit that dissolves with effervescence in dilute acids, and which under the microscope is shown to be composed of concretions of little spheroids.

Cystin—Cystin is occasionally met with as a lemon-colored deposit in urine of faintly acid reaction. This substance contains twenty-six per cent. of sulphur. On standing for some time the deposit is apt to turn of a greenish hue and to develop the disagreeable odor of sulphuretted hydrogen. The microscope reveals "mother of pearl" highly refractive hexagonal crystals, which are distinguished from those of uric acid having a similar appearance by treating the specimen on the slide with ammonia. The ammonia is allowed to evaporate with the result that in the case of cystin we see again the six-sided crystals of this compound; whereas, if the crystals were those of uric acid, we get instead ammonium urate spherules.

Leucin and Tyrosin—These deposits are nearly always associated together, being observed for the most part in cases of destructive lesions of the liver. The former occurs in the shape of somewhat striated yellowish spheres resembling oil

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drops, from which they are differentiated by their insolubility in ether. Tyrosin is observed in the form of tufts or sheaves of very fine needles, snow-white when viewed en masse.

Cholesterin—Large, thin and nearly transparent plates of this substance, with broken corners, are occasionally encountered in the urine of cystitis.

Fat—A milky aspect of the urine is sometimes due to the presence of chyle or fat. In such an event the turbidity disappears on shaking with ether. Under the microscope we see different-sized highly refracting globules with dark and somewhat irregular borders.

Melanin—This black pigment, significant at times of melanotic cancer and other pigmented tumors, gives to the urine a dark color on exposure of the latter to the oxidizing influence of the atmosphere. It occurs in lumpy granules soluble only in boiling mineral acids or strong solutions of the caustic alkalies.

Mucus and Pus—Mucus and pus corpuscles are histologically identical, both being immature epithelial cells; the pus corpuscles are developed more rapidly than the mucus cells. A delicate cloud of mucus is nearly always to be seen floating near the bottom of a flask of urine which has stood for some hours. Under abnormal conditions of irritation or inflammation this deposit is greatly increased and becomes viscid, slimy and ropy in character, permeating perhaps the whole volume of the fluid. As already stated, the nebule of mucus may be confounded with a calcium oxalate sediment, and indeed they are often co-existent, for obvious reasons. A deposit of pus differs from that of mucus in being of a heavy creamy consistency and color, rapidly settling to the bottom of the containing vessel. It is readily distinguished from turbidity due to urates and phosphates by the action of heat and of acetic acid, both of which coagulate a muco-purulent sediment. A simple test for pus consists in treating the deposit in question with a strong solution of sodium or potassium hydrate, which dissolves the corpuscles into a transparent, tenacious, gelatinous mass resembling mucus and poured with difficulty (like

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the white of an egg) from the test tube. A practical point of differentiation between pus and mucus is the presence in the former instance of albumin in the supernatant or filtered liquid. Under the object glass pus and mucus cells appear much like leucocytes, from which indeed they are derived. A drop of acetic acid under the cover-glass clears up the granules and reveals the cell nuclei, usually a single one in the case of mucus, and multiple in pus corpuscles. In gonorrheal urethritis the pus cells are held together in threads and bands by mucin, and are often attended by spermatozoa.

Blood—On centrifugation the red blood corpuscles, if present, are thrown down in a dense reddish layer, of a much deeper shade of color than the urates. The supernatant liquid contains a trace or more of albumin. Under the microscope the colored blood cells are usually known easily from their biconcave discoid form. The difference in level between the central circle and the outer ring is shown by the separate focus of each, one appearing dark when the other is light. In heavy urine the globules become condensed and crenated; in very light urine they take on more of a spherical form. As seen under the glass they are practically colorless, and are not arranged in rouleaux as in blood from other sources. When the blood in the urine is from the urethra it is passed in a clear state at the beginning of micturition; when from the bladder it is forced out in clots at the close of the act. Hemorrhage from the ureter is often accompanied by macroscopic casts of the calibre of this canal. In renal hemorrhage the blood is intimately mixed with the urine, imparting to it a smoky look; microscopic tubule blood casts are always present.

Fibrin—Spontaneously coagulable urine, due to the presence of the fibrin of blood or lymph, is a rarity in this country. Alkaline pyuria with the formation of gelatinous clots is distinguished from fibrinuria by shaking with water, which in the former instance dissolves and thins the coagulum but has no effect on the fibrin. The latter yields only to hydrochloric acid with pepsin.

Epithelium—It was formerly believed that the shape of epithelial cells indicated their origin, whether from the kid-

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neys, the ureters, or some other division of the urinary tract. This notion is no longer tenable, since all the characteristic forms are found in the different strata of the lining membrane of the bladder. It is true, however, that a predominance of small round cells (especially when accompanied by casts) implies an affection of the kidney; in pyelitis the columnar cells predominate; in bladder disease the large squamous cells are usually most abundant; epithelial cells from the vagina are even larger than those from the bladder and are often found joined together in flakes or sheets. Generally speaking, an excess of epithelial cells in the urine is indicative of irritation or inflammation of some portion of the genito-urinary tract. These cells are readily distinguished by their relatively large size and by the single well marked nucleus visible without the aid of reagents. In chronic lesions of the kidney the round cells are partially disintegrated and are often dotted with fat drops.

Bacteria—We occasionally have to examine a specimen of cloudy urine which does not clear up wholly on filtration. This remaining turbidity is due to bacteria or fungi which are so small as to be able to penetrate the pores of the filter paper. The urine can be rendered perfectly clear by treating with magnesian fluid (one part each of ammonium chloride, ammonium hydrate and magnesium sulphate in eight parts of water), gently heating, and then refiltering. Of the varied forms of micro-organisms that set up putrefactive changes in the urine within or without the bladder, the micrococcus ureae and bacterium termo are the most common. The former appear under the microscope as trembling points isolated or collected in strings; the latter are comparatively large oblong cells with flagella. Tubercle bacilli and other pathogenic bacteria can seldom be discovered without the aid of the centrifuge.

With respect to tube casts, tumor fragments, parasites, spermatozoa, foreign bodies and other objects which go to make up a urinary sediment, the limits of this paper will admit only of a mere mention.

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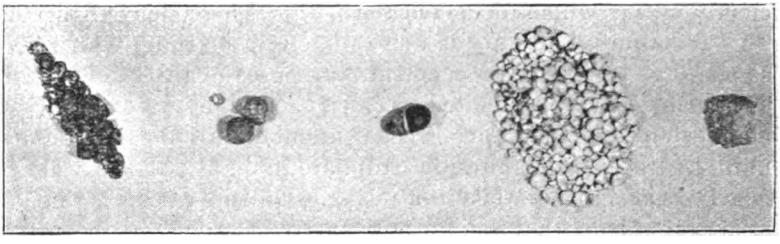
GALL STONES—A MEDICAL REVIEW.

E. R. AXTELL, M. D., DENVER, COLO.

In the past eighteen months I have seen ten cases of gall stones, and have in addition made autopsies on five persons who had stones in their gall bladders.

Mrs. B., aged 50 years, came to Colorado two years ago for asthma; since coming here her asthma has been more paroxysmal than before, but some of the attacks have been very severe. She gave a history of having had an attack of hepatic colic five years ago. Her first attack in Colorado was one year ago, and was a very severe one. After a few attacks, none of which were attended with jaundice, I determined to test the efficacy of olive oil, and gave her in two doses a pint of this oil. Here are some of the stones she passed after this



dose. In all she passed over thirty such stones. Her gall bladder is enlarged, painful, hard, and is undoubtedly full of stones. I have advised an operation, but to this she will not consent. She is taking phosphate of sodium and an occasional dose of turpentine, and has not had an attack of colic for three months.

Mrs. S., an elderly lady who was in the best of health, and who had never had any ailments, was suddenly taken with an attack of hepatic colic, which required two grains of morphine, hypodermically, to control the pain. Some jaundice followed, but the stone was not found.

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Mr. H., aged 65, gave a history of three attacks of hepatic colic, each attack lasting a day or two at a time, followed by slight jaundice, and each by a discomfort in the right hypochondrium which lasted for weeks at a time.

Mr. F., aged 26, gave an extended history of lithiasis with the many peculiar symptoms of that disorder. He was seen by me while passing a gall stone, and complained most seriously of the pain characteristic of this trouble in the small of the back just under the floating ribs. I had the bowel movements washed for a week after his attack and he passed on the fifth day a stone weighing twelve grains. This he kept.

The other five cases were simple cases of hepatic colic, and presented no points of sufficient interest for a detailed report. All of the attacks were the first experienced by the patient, except in one case. All of the patients were under observation for several weeks, and as far as I know, have not had any return of their trouble.

The five cases of autopsies are most interesting. The pathological record of Mrs. H., from whom this large light stone was taken, was in detail as follows: Universally adherent pleurae, both being completely occluded by old adhesions; marked fibroid pneumonia at base of the right lung; fresh pericarditis with rupture of the right coronary artery, the first pathological specimen of this kind which I have ever seen. There was an interstitial nephritis of both kidneys, and a goose egg shaped fibroid of the uterus which was calcareous. The stone which she had in the gall bladder is made up of cholesterine; during life she presented no symptoms of stone in the gall bladder. Stones like this are usually found in the ducts, but this was found in the cavity of the gall bladder.

Mrs. G., aged 55, after fifteen months of illness with symptoms referable to the gall bladder, liver, and stomach, suffered an exploratory operation and a carcinoma of the liver was found. She lived six weeks after the operation, and at her death I made a post mortem on her body. The 341 stones here were found in her gall bladder, and the carcinoma was found to be primary with the liver, one of the large nodules pressing

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on the cystic bile duct, but not occluding it. These stones are made up of cholate of lime, largely.

Mr. F., aged 35, was a patient at the County Hospital, and died of tubercular meningitis and tuberculosis of the left kidney. Very little of his previous history was obtainable. On the autopsy a brownish mulberry mass was removed from the gall bladder. This stone I found to be made up of bile pigments.

Miss K., colored, probably 30 years of age, a prostitute, suffered during life with evidences of gall stone, but died of a peritonitis. At the post mortem I found an immense purulent salpingitis of the left tube, and a general peritonitis from rupture of this abscess. These three stones were found in her gall bladder. Their composition is cholesterine and lime salts.

The fifth case was one of carcinoma of the pylorus, with secondary involvement of the liver. The patient was a male of an advanced age, and the carcinomatous nodules pressed directly on the cystic duct as well as on the gall bladder. The stones consist of inspissated mucus and lime salts.

These cases thus briefly reported are of no special value, but are of fair interest. If we study the etiology of gall stones we can reduce the etiological factors to very few in number. First, a catarrhal condition of the biliary passages, either of the common or the cystic duct, which catarrh, by providing an excess of mucus, would favor the formation of stones in the gall bladder. Second, this inflammatory catarrh, by lessening the alkalinity of the contained bile, would cause the cholestrine to be precipitated and probably an abnormal deposition of lime salts to take place. Third, the catarrhal condition, by blocking the passage of bile in its way toward the bowel, would produce stasis of the bile in the ducts or gall bladder. Fourth, the gouty diathesis by its presence makes the deposition of lime salts easy. Fifth, pressure alone on the biliary ducts may cause a deposition of bile salts by simple stasis in the flow of the bile.

With these clear etiological factors before us, the indications for medical relief are clear and ofttimes efficient. I have

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long ceased to believe that we can dissolve these stones, and yet I do not believe to-day, as strongly as I once did, that many of these cases should be operated on. I give you now the medical treatment for gall stones that I have found to be the most satisfactory. Considering our etiological factors, we find we have the following indications for treatment: First, to produce a free secretion of bile and its free flow; second, aid in the solution of mucus and antagonize the development of acids by administering an alkali; third, overcome stasis; fourth, regulate diet and get the duodenum aseptic if possible. This treatment only has to do with that state following a history of the passage of a stone. There is only one treatment for the attack, and that is morphine with local applications. Where stones have already formed, we can only hope to remove them and prevent others from forming. To get the best secretion and flow of bile, gentle exercise, such as horseback riding or massage of the abdominal muscles, is of service. It has been well said that "a horse is a good thing for the inside of a man."

We have in carbonate and salicylate of soda excellent remedies in these early cases. Ten to twenty grains will increase the flow of bile, will increase the alkalinity of it, and will get the duodenum in a fairly aseptic state. With these measures many of the alkaline mineral waters are of service. Rich and fatty foods should be prohibited. Fat is emulsified by bile, and when bile is diminished in amount fat must not be taken. But little meat should be eaten, but vegetables should be used freely. Phosphate of soda is as good now as it was fifty years ago, and thirty grains night and morning can be taken for months at a time. Olive oil in large doses—six, eight, ten and twelve ounces—will often be of service, as in the first case reported. Exposure and wet must be avoided. An occasional dose of turpentine seems to be of the greatest value. How it works we do not know.

Whether the peculiar combination of alkalies in the water in Colorado is responsible for the number of gall stones which we see here is a question I am unable to answer.

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PREPARATION OF ANTITOXINE.

W. A. KICKLAND, M. D., FT. COLLINS, COLO.

Fifty years ago the practice of medicine was almost entirely empirical. Diseases were treated by name, and medicines were given without a knowledge of their composition or physiological action. Each named disease had its list of drugs, and in case the disease could not be named, a little of the whole pharmacopoeia was given in the hope that a scattering shot might strike the vulnerable point. Since that time physiology has made rapid strides. Pharmacology has become a science. Rational medicine has at last come to the front, and the art of medicine is being builded on the firm foundation of science. Shot-gun prescriptions are out of date. We treat the patient, and that, too, knowing why, and knowing what to expect. The physician of to-day knows not only the general action of drugs, but their specific action, their origin, and their preparation. It is with regard to the preparation of one of the newer therapeutic agents that I wish to speak to-day.

It has long been known that in many of the infectious diseases, one attack renders the individual immune against further attacks. Scarlet fever usually occurs in the same individual but once. Mumps and measles almost never the second time. In 1789 Jenner carried this idea a little further, by finding that a person having had cow-pox is insusceptible to the virus of small-pox. Something has developed within the organism which acts as barrier against further invasion. To find this something, to isolate it, and to produce it artificially in the lower animals is the idea which kept Pasteur, and is keeping such men as Koch, Roux, Behring, Vaughan and McClintock at work, with antitoxines and nucleins as the result.

Just a word regarding the bacillus may not be out of place at this time. In 1883 Klebs discovered the microbe in the false membrane from the throat. In 1884 Loeffler isolated the germ and studied its mode of growth, method of staining, etc.,

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and since that time the germ has been known as the Klebs-Loeffler bacillus. In 1888 Roux and Yersin isolated the toxine and produced with it the diphtheritic paralysis in animals. Later, Behring and Fraenkel worked with vaccination against diphtheria and tetanus, and in 1891 Behring and Kitasato discovered the principle of serum therapy for diphtheria and tetanus, and since that time a large number of workers have devoted their energies to the study of the subject. Among those who stand first at the present time in connection with the subject are Behring and Aronsen in Germany, and Prof. E. M. Roux, of the Pasteur Institute, in France. Behring holds the honor of having discovered the principle and made a number of interesting observations, while Roux has applied the practical side in treating the human subject, probably more than any other one investigator. As we are interested in the practical side of the question, I have paid special attention to the work of Roux, and shall report his manner of working.

The method followed by Roux may be divided into three stages, as follows: (1) Preparation of the toxine, (2) immunization of the animals, and (3) the drawing and preserving the serum.

PREPARATION OF THE TOXINE.

A virulent culture of the Klebs-Loeffler bacillus (one that will kill a guinea pig of 500 gramms weight in thirty hours) is selected, and with it a flask of sterilized alkaline peptone bouillon is inoculated. This is plugged with cotton and placed in the incubator at 36 degrees C. for twenty-four hours. At the end of this time the flask will be found to contain large numbers of active bacilli. This flask is kept as a stock culture, and from it the special flasks used for producing the toxine are inoculated. It has been found that as long as the germ remains living and intact only a small amount of the toxine is freed, but if grown rapidly and in the presence of moist air, many of the bacilli break down and liberate their nuclei containing the toxines. For this purpose Dr. Fernbach devised a special form of flask, made so as to furnish a large surface of exposure to the air, and to permit of a circulation of air through the apparatus. His flask has a large diameter with a

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flat bottom, and has side tubes coming within an inch of the bottom. These flasks are filled nearly to the level of the side tubes with alkaline, peptone bouillon, sterilized and inoculated with about 40 c. c. of the stock culture to each flask. They are then placed in an incubator for twenty-four hours to start them, and are then connected with an aspirator and air drawn through them, the flasks being still kept at a temperature of 37 degrees C. The air is first passed through water to remove foreign particles, and to moisten it in order to keep the bouillon in the flasks from evaporating. At the end of three weeks the bouillon is cloudy with a substance which the microscope shows to be broken-down bacilli, and is very rich in toxine. The bouillon is then filtered through a Chamberlain filter into sterilized flasks, and tested as to its strength. It is a peculiar fact that flasks containing the same bouillon, inoculated from the same cultures, and grown under the same conditions, vary greatly in virulence. The standard strength is one, 1-10 gm. of which will kill a guinea pig of 500 gms. weight in twenty-four hours. This solution of toxine must be kept in the dark and at the same temperature, or its virulence will be changed.

IMMUNIZATION OF ANIMALS.

This may be done in two ways—either by inoculating with the germ, or injecting the filtered toxine either subcutaneously or intravenously. Nearly all the domestic animals have been experimented on for obtaining the antitoxine. Quite an amount of work has been done in Germany on the cow and goat with a view to obtaining the antitoxine in the milk. It is quite easy to obtain the antitoxine in the milk of the immunized animals, but it is in so dilute a solution that it is difficult to work with; besides, the cow is very susceptible to the poison, and unless great care is taken, dies before immunity is established.

At present when a large quantity of serum is desired the horse is used, and the toxine is used for immunizing. The horse has been found to withstand the effect of the poison well, and to furnish a very energetic grade of antitoxine. Any sound, healthy horse is used, the age not making much differ-

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ence. First, the horse is injected with tuberculin and mallein, to be sure that neither tuberculosis nor glanders is present, and then with 1-2 c. c. of a standard solution of the toxine, and the effect watched. If the horse becomes quite sick, a smaller dose is given the next time, and as soon as possible the dose increased. In general it is as follows: The first day, 1-2 c. c.; the eighth day, 1 c. c.; the fourteenth day, 1 1-2 c. c.; the twentieth day, 2 c. c.; the twenty-eighth day, 3 c. c.; the thirty-third day, 5 c. c.; the thirty-eighth day, 8 c. c.; the forty-third day, 10 c. c.; the forty-seventh day, 20 c. c.; the fifty-first day, 30 c. c.; the fifty-sixth day, 50 c. c.; the sixty-second day, 50 c. c.; the sixty-eighth day, 60 c. c.; the seventy-fourth day, 100 c. c.; the eightieth day, 250 c. c.; the eighty-eighth day, 250 c. c. At first there is a marked local oedema and a rise of 1 to 2° in temperature. Later the horse bears the larger dose with no general symptoms, but there is considerable local oedema which passes away in a few hours. From time to time some of the serum may be drawn from the horse and its antitoxic properties measured. This is done by treating young guinea pigs of 500 gms. in weight. The standard strength is such that one grm. will protect 50,000 gms. of guinea pig from a standard virulent culture of the germ. The antitoxine is injected twelve hours before the germ. Not even a local oedema is produced.

PREPARATION OF THE SERUM.

When the horse is thoroughly immunized (eighty-eight days) it is ready for the withdrawal of the blood and preparation of the serum. Glass bottles holding 2,500 c. c. are sterilized. A trochar, with canula and a rubber tube, also sterilized and kept in a five per cent. carbolic acid solution are at hand. The horse is blindfolded and held by a rope twisted around the upper lip. The neck is shaved and is scrubbed with a five per cent. carbolic acid solution. An incision is made in the skin over the jugular vein and the vein laid bare. The trochar and canula are plunged into the vein in the direction of the heart, the trochar withdrawn, and the blood allowed to flow into the sterilized bottles. From six to eight litres of blood are taken from a horse at one time. This may be repeated from time to time, as the horse regains its normal

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amount of blood, the immunity being kept up by fresh injections of the toxine. The blood when drawn is allowed to coagulate and is then placed in an ice chest. At the end of twenty-four hours the serum has separated and can be poured off. Two to three litres are thus obtained from a horse at one time. A small piece of camphor is now added to the serum to prevent the growth of micro-organisms, and it is now ready for use. Trikresol is used by some manufacturers and is said to be a better preservative than the camphor. The serum can be kept for some time in this condition if kept cool and in the dark. It can also be dried in vacuo and kept for a longer time, but it loses some of its curative qualities in this condition, and has the disagreeable feature of causing considerable irritation when re-dissolved and injected.

The method of using the drug and the results obtained are familiar to all of you, so that I need not repeat them here. Of the fact that serum therapy has markedly reduced the death rate I believe we are all convinced, and statistics are unnecessary.

Of one or two points only in administration I beg leave to speak. It has been found that a small dose of antitoxine will save the life of a guinea pig if given twelve hours before the poison of diphtheria. A much larger dose is necessary if both are given together, and if delayed too long after the poison, no amount will keep the animal from dying.

The term antitoxine is a misnomer. The remedy does not act by directly neutralizing the poison, but by stimulating the cells of the body to produce a neutralizing substance. Antitoxine will not restore the epithelium of the kidney destroyed by diphtheritic poison, nor will it usually remove the false membrane from the larynx, but by giving it early the poison is neutralized and prevented from producing these pathological changes. So to get the best results it should be given at the earliest possible moment.

Another point I would mention is, that not too large doses should be given; 1,000 to 1,500 units repeated as necessary will give better results than larger doses. The unpleasant complications such as rheumatic pains, urticaria, etc., seem to depend mostly on the quantity of fluid injected. Some of the

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manufacturers are now making a preparation in which the 1,000 units are contained in 2 c. c. of the serum instead of 10, and it is expected that this will remove many of the undesirable sequelae which have hitherto arisen.

Much more might be said about other serums, such as those for titanus, snake bite, etc., but whatever comes of these it is a fact that diphtheria antitoxine has come to stay, and should be a part of the armamentarium of every practitioner of medicine.

ACNE.

J. M. BLAINE, M. D., DENVER, COLO.

According to the statistics prepared by the American Dermatological Association, acne ranks third in order of frequency, constituting eight per cent. of all cases seen in dermatological practice. These figures, however, can hardly be accepted as representing the true proportion, for many cases are never treated at all, while many others are never recorded. So that I would venture the assertion that if all cases were recorded the percentage would be doubled.

Viewed from a pathological standpoint acne is not a serious complaint, but if we estimate the disfigurement and chagrin occasioned to the patient, together with its frequency, we must consider it one of the most serious of dermatoses, and its proper management of the greatest importance.

At the time of puberty the glands of the body undergo a decided change, and the hair roots on the face that have apparently been dormant up to this time suddenly begin to develop. In many cases this change takes place without any pathological condition resulting from it, while in others the increased activity amounts to an inflammation which begins in the sebaceous glands and extends to the hair follicle. The sebum is changed in character and usually increased in amount, while the peri-follicular inflammation in the hair follicle causes an exfoliation of the stratum corneum so that the

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duct becomes plugged up and the resulting comedo or plug is composed of epidermic scales and sebum, and occasionally fragments of hair. With the mouth of the duct thus occluded the duct becomes distended, and the accumulated contents form a convenient nidus for the lodgement of pathogenic micro-organisms with the resulting pustule.

In a typical case of acne the lesions are found in all stages of development, from a small comedo to a large pustule.

The most simple classification of acne is to divide it into two classes—acne simplex (or vulgaris), and acne indurata; the former covering all superficial cases, and the latter applying to those that are deep seated. These two divisions imply as much and are less confusing than to use the subdivisions that have been suggested from time to time, such as acne artificialis, atrophica, cacheticorum, frontalis, keratosa and about a dozen others whose utility consists more as an outlet for literary ambitions than in expressing a pathological or anatomical condition.

The term acne rosacea is an unfortunate compound which has escaped the critic's eye until recent years, when common sense came to our assistance and divorced the terms which have nothing in common except their location.

Acne may occur at any period of life after the age of puberty, but is most common between the ages of fourteen and twenty-one. It may occur on any part of the body that is supplied with sebaceous glands, but is most common on the face, back, and chest.

The chief cause of acne is the change which takes place at the time of puberty in the hair-forming apparatus. It may also be produced by an irritation, either local or reflex, and when once established may be prolonged indefinitely by a very slight irritation. This is due to the fact that after it becomes chronic the epidermis has become thickened and the follicles dilated, so that it is difficult for the sebum to be passed out when excreted. Under these circumstances a slight derangement of the stomach, liver, bowels, kidneys, or sexual apparatus may prolong it for years.

A case of acne indurata of nineteen years' standing which I recently treated, began during the first gestation.

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Some years later it abated during the second gestation, only to return after parturition. Any deviation from, normal health or habits may produce acne, and in searching for a cause it will be necessary to interrogate thoroughly every internal organ.

Among local causes may be mentioned irritants, cosmetic applications, and uncleanliness.

As the time limit for the reading of this paper will not permit of a fuller discussion of the symptoms and causes, I must leave this part of the subject with this brief and imperfect outline, and pass to the more important consideration—viz., the treatment of acne.

As a large percentage of these cases are kept up by gastro-intestinal irritation, the first point to be considered is diet. The food should be nutritious, but non-irritating; all articles of diet which are known to be irritating, and which in some cases are sure to produce acne, should be proscribed. I have so frequently found persons with weak digestive powers who had fallen into the insane idea that oatmeal, whole wheat, and so-called health foods were good for dyspepsia, when in truth they are only good to produce the disease the patient thought to cure.

After carefully regulating the diet, I have found much benefit in these dyspeptic cases from the administration of tincture of hoang-nan, which contains the alkaloids strychnia and brucia. It increases the appetite and stimulates both gastric and intestinal digestion, and, as pointed out by Shoemaker, has also an effect on the sebaceous glands, "correcting both the quantity and quality of the secretion." Where the liver and bowels are torpid and the circulation filled with ptomaines, excellent results may be obtained by the administration of sodium sulphate.

The kidneys being in close sympathy with the skin should be carefully looked after. If their excretory function is not properly performed a diuretic is indicated; besides, if any specific disease exists in them it should receive attention.

Amenorrhoea, dysmenorrhoea, displacements and inflammation of the womb are all fruitful causes of acne and should receive proper attention.

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If the patient suffers from anaemia or chlorosis, or in cases of so-called acne cachecticorum, iron, arsenic, phosphorus and cod liver oil are indicated. In robust cases with a tendency to the formation of large quantities of pus, I have always obtained good results from the use of sulphide of calcium. This should be freshly prepared, as the pills are liable to be old and insoluble—therefore, inert.

By far the most important part of the treatment of acne is the mechanical. The instruments for this purpose consist of a comedo extractor, an acne lance, and a curette. All comedones that have not suppurated should be carefully pressed out. The best instrument for this purpose is the one devised by Unna, which is shaped like the handle of a spoon, with a small, round opening in the end; this instrument is easy to keep clean, and with it one can always see the comedo and the effect of pressure. If inflammation and suppuration have taken place the lesions should be opened with the acne lance and allowed to bleed freely so as to get rid of the pus, the comedo, and also the inflammatory engorgement. In cases where the corneous layer is thickened and the skin is studded with comedones and pustules the quickest and best plan of operation is by the use of the curette. After washing the face thoroughly with an antiseptic solution the curette should be passed rapidly over the surface with a free hand movement. This action removes the corneous layer, while the pustule and comedones are exposed to view. Then by reversing the curette and pressing the dull edges over the comedones and pustules, they are easily expressed. The best curette for this purpose is the one recommended by Bronson, of New York, which has a long fenestra tapering toward the point like the shape of an olive. If this operation is thoroughly done about once a week the length of time required for a cure will be very much shortened.

Having attended to the mechanical treatment, the next consideration is local medication. As the immediate cause of acne is the invasion of the staphylococcus pyogenes, all local applications should contain a germicide. After curetting the surface and evacuating the pus and comedones, one of the best preparations I have ever used is an ointment containing one

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drachm of the oleate of zinc and twenty grains of resorcin to the ounce. This should be applied at night after thoroughly bathing the face in hot water. In the morning, if patients wish to appear on the streets or attend to business, I have them apply a lotion of hydrarg bichloride, sulphuric aether and rose water, or if the patient be a lady who wishes a cosmetic, I use zinc oxide, calamine powder, glycerine and rose water, to which may be added any convenient germicide.

In milder cases, or where the patient objects to the use of the curette, good results may be obtained by the use of sulphur or ichthyol; these are both good examples of keratolytic, germicide and stimulating remedies, and in chronic cases will accomplish much.

In acute cases, where there is much inflammation and little pus, mild astringents with a germicide will suffice. The base of all these ointments should be lanolin, to which may be added twenty-five per cent. of almond oil, which renders it more pliable and less sticky.

In speaking of the causes of acne I mentioned uncleanliness. By this I mean that some persons, through fear of injuring the skin, do not use a sufficient amount of soap, or a soap of sufficient strength to relieve the skin of the effete material exuded from it or the extraneous matter which attaches to it. Hebra was fond of applying a lather of green soap to the face at night and washing it off in the morning. During the night the green soap, by virtue of having an excess of alkali, exerts a chemical action on the sebaceous material, and when washed off leaves the follicles free from effete material and also exerts a stimulating action on the skin. This plan of treatment is too severe for many patients, but there are some who could use it to advantage and many more who could derive benefit from its use as a toilet article.

The finest complexions in the world are possessed by the daughters of the peasantry who, through force of circumstances, are compelled to observe the laws of hygiene in regard to exercise and sleep, who do not use cosmetics, and who wash their faces with soap which is strong enough to produce the effect desired.

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To prove to you that this picture is not overdrawn, I may cite the case of a young lady who recently came under my treatment, who had abstained from the use of soap for a period of two years. Practically every follicle on her face either contained a pustule or a comedo. Now she washes her face with sapo viridis, and this, combined with the treatment suitable to her case, is fast bringing her complexion back to its normal condition.

The use of massage and electricity is indicated in chronic cases of acne and may be resorted to when other measures fail.

The prognosis in acne is always favorable; every case should be cured if properly treated. Many cases get well of their own accord at or before the age of maturity, but the danger in allowing a case to continue untreated is that the disease will cause cicatrices, which, while they may be contracted to a limited extent, can never be eradicated.

This paper is a mere outline of the causes and treatment of acne. I have aimed to give you a general plan rather than minutiæ. There are many useful remedies which I have not space to mention, but your knowledge of materia medica will suggest them when indicated. The plan which I have briefly outlined is one that has the approval of many of our best dermatologists, and the one with which I have had most success.

DISCUSSION.

Dr. J. N. Hall—This disease is a very common one. I presume I have seen twenty statements in the lay press that soap should not be used on the face, but the juice of a lemon, or oil, or glycerine, and wiped off with a warm cloth the next morning. I have certainly, although I am not a dermatologist, seen women who have the appearance of never having used any soap on the face for many years, and judging from the acne and the comedones present, it would seem they used some such substance as glycerine on the face, which makes these things more distinct than ever. It seems to me that it is a very safe treatment—the use of soap. But one other point in regard to acne—that is, many people suffering from this disease are charged with having venereal disease by non-professional peo-

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ple, as many people know that syphilis, for instance, has a rash; and I have many times heard such a statement as "that So-and-so must certainly have syphilis, although, of course, he would not tell me; but I know it, because he has an awful rash." It is bad enough to have acne without having to be branded with the charge of having syphilis.

MOUNTAIN FEVER NOT SYNONYMOUS WITH TYPHOID.

B. F. WOODING, M. D., DENVER, COLO.

Mountain fever is a disease; but from the miscellaneous use of the term we are no nearer the true understanding of the particular ailment after the diagnosis has been made than before. It may be anything, from a "cucumberitis" to a true fever—some even going so far as to give it the awe-inspiring term of "typhoid fever." To call it the latter is a great injustice to both the profession and laity; to the former, because of the seemingly miraculous results; to the latter, by compelling extra expense, care, and anxiety.

Mountain fever requires but little attention, no extra precaution as to the disposal of stools, or the use of disinfectant solutions, and no needless worry. In typhoid, all these are necessary.

If there can be no limitation to the distinctive diagnosis of the disease known as mountain fever, I agree with the opinion of Dr. Work, as expressed in a reprint under date April 8, 1893, that "it would be to the credit of diagnostic accuracy if the vague term 'mountain fever' were expunged from the nomenclature of the Rocky Mountain practitioner."

There is a disease that has properly been named mountain fever. A similar disease, changed by the influence of its surroundings, is called malaria. At its first ingestion this may require a little "salt." But in this country of great resources, both in politics and religion, we glean from the mountains atomic truths. The points upon which this theory is based are many, viz.: The sources of the two diseases are the same—ani-

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mal and vegetable decomposition; the conditions surrounding their origin are the same—disturbed moist new earth; the mode and result of infection are the same—a locking up of the secretions in the secretory glands, high fever, and nervous excitation, the latter being complicated by rigors through the influence of low altitude in malarial districts, and for the same reason quinine losing its effective power when given in mountain fever; both infections are transmitted through the air.

In the development of this disease the same conditions for its special features exist. In the low prairie lands the farmer rolls over the fresh new earth, liberating one breed of malaria, planting another by rolling under the furrow and burying the thrifty growth of vegetation that covers the land. In cities the streets are occasionally dug up by workmen in making improvements, which liberates malarial germs. In mountainous countries these conditions are not supposed to exist. But this is a mistake. We are being continually surrounded by new earth, the disturbance of which is produced by concentration of the elements in the form of rain and snow, which, after falling, gather up the juices and vegetation from the thousands of square miles of our new land, laden with factors of future mountain fever. These form streamlets, and later torrents, which plough down the mountains, tearing out here and there rocks, boulders, and decomposing vegetation, buried there by some preceding storm. As this is being hurled along, a new deposit of organized matter is being thrust aside, and thus the roll of disintegration continues, forming a never ending source of malaria. Another source, and one that has particularly called my attention to the origin of this disease, is its appearance in newly plastered houses, since I have seen entire families come down with the most pronounced form of the disease.

In the southern part of the state the adobe house is the chief dwelling of the Mexicans. They do all their building in the spring and fall. The material for the bricks with which the house is constructed is made by the Mexicans stamping hay and straw into mud in excavations which have been used for years for that purpose, and in which water collects after a rainfall and is permitted to become stagnant unless used in this way; and when used, it contains the results of previous stagna-

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tion. Hence, after each building and plastering season there is a rich harvest of mountain fever. A noticeable difference between this and typhoid fever is, that acclimation immunizes greatly against mountain fever, while it has but little influence on the effect of typhoid fever. Not one in ten new comers escapes mountain fever in some degree. The disease is believed to be of bacterial origin, the product of which poisons the system and locks up the secretory glands, causing great prostration, nervous excitation, and occasionally delirium which may occur in a few hours. Its symptoms are: Increasing malaise from a few hours to a day or two; increasing temperature which often runs up to 104 and 105 degrees in twenty-four hours after onset of disease, with morning remissions; more or less aching over the entire body; great prostration and weakness, which is slow of recovery after a severe attack; nausea at times and poor appetite.

The disease is not dangerous, nor liable to bad complications. It responds quickly to treatment, which is simple.

The patient should be placed in a large, cool, very quiet and well ventilated room, with no thought of business or anxiety, since by concentration of thought the temperature will increase one or two degrees. Diet should be restricted to ice-cold buttermilk or peptonized milk every three hours, followed by carbolic acid and iodine in small doses; calomel and podophyllin once or twice every day, followed in the morning by a seidlitz powder; occasionally dilute nitro-muriatic acid may be given with benefit. Quinine is of little use unless rigors should supersede the nervous manifestations.

In the southern part of the state I had a large contract practice of four years' duration, in which time I had over 200 cases of mountain fever without the suspicion of death. In the worst cases not a shadow of doubt ever troubled me as to their ultimate recovery.

If my typhoid friends care to attribute this to remarkable success in handling "typhoid fever," well and good. I, for my part, shall place these cases where I think they belong.

DISCUSSION.

Dr. Sol. G. Kahn—I don't know whether I understood the doctor fully, but I understood him to say that mountain fever

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is the same in mountainous districts as swamp fever is in swampy districts—Texas fever in Texas, etc. Take it in Leadville: The time of the year when physicians find mountain fever is usually in the fall—October or November—when everything is frozen up solid. There are no excavations, as they are almost impossible, and they never plow the ground, because we have nothing to plant; and the mining is done so far from the city and houses I think it would be impossible, from what dirt is thrown up on the dumps at the mines, for any poison or germs or fumes to affect people living in the city some four or five miles from there. Some two years ago or thereabouts, when Dr. Alfred Loomis was preparing his last paper or book, he wrote to Dr. Solly, of Colorado Springs, regarding mountain fever. He also wrote to physicians in Leadville to pay attention and see if they could find any mountain fever, and what there was of it. For over six months the majority of the physicians in Leadville watched very carefully for mountain fever, and there were several physicians who discovered mountain fever; and patients whom they would treat for mountain fever would usually have a fluctuating temperature, and they would allow them to continue their regular diet, restricting it to some extent, allow the patients to be out of bed some of the time, and lie on the lounge or on a couch, or sit up in bed—any way that made it convenient for them, so that they were not allowed to leave their rooms. After a few days the physician would usually be discharged—the patient would become dissatisfied and call in some other physician, who would come in and find a temperature of 103 to 105. He would put the patient to bed and upon a typhoid treatment, and your patient would feel more comfortable and commence to improve. We came to the conclusion that it was not mountain fever, but that it was typhoid fever in a mild form; and I have never been able to decide that there was a distinct disease called mountain fever, although with these cases of so-called mountain fever we never could find the typhoid rash, which is very seldom found in typhoid cases in our city. Although we have looked for it we never or seldom found the rash. Typhoid cases for the first week or ten days do not run the same course there, or never have, that they do in other places. New physicians coming to the town usually

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have a great deal of trouble in diagnosing typhoid fever for the first two weeks. They do not know what it is, and do not know how to treat it, and they have a great deal of trouble until they get more thoroughly acquainted with the circumstances of the case. They do not run the regular course at first that they do in other places. Later on they run the same course as we see them in the East.

Dr. T. J. Melvin—I believe there is no disease in the state which has as much interest, and has created so much confusion in the minds both of the people and the medical profession as this subject of mountain fever. Fifteen years ago, in a mining community where I first came to settle, there was an epidemic of mountain fever, if it might be so called. I called it mountain fever because the other doctor did. It was not typhoid fever, though there were premonitory symptoms which usually go with an attack of typhoid fever; but the symptoms passed off with comparatively little fever and were of short duration. The treatment at that time was largely quinine, and the patient did so well that it has been my belief since then that it was, as has been explained, of a malarial nature. Several years later I was in the southern part of the state where a large amount of new ground was opened up, and there was another epidemic of what was called mountain fever. Much the same symptoms occurred; but in those cases there were a number of severe cases of typhoid fever, so that in those particular cases the physicians with whom I came in contact, as well as myself, decided that the position that had been taken before this Society by a number of its members was correct, that typhoid fever and mountain fever were one and the same. Since that time I have seen in several of the new mining camps, in the springtime especially, an epidemic wherein there was muscular pain with high fever, which showed a tendency to alternate from day to day—one day better, the next day worse. During the last few years these epidemics have answered the description of what we ordinarily call grippe. This spring I have seen a great many cases—probably fifty or seventy-five—from the new mining camps in the Gunnison, which were commonly called attacks of mountain fever, where the prostration has been marked, the throat has been more or less congested, severe headaches, se-

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vere backache; seldom any intestinal trouble; usually a strong tendency to pulmonary trouble, one or two cases of pneumonia having occurred in that number; but with this exception, all these cases which came down from the mining camps, after a few days' treatment, have universally recovered. It took quite a long time to entirely recover their strength—from one to two weeks. Now, although all the symptoms are those of the disease which we commonly call la grippe, I know that it is often called mountain fever in many localities. It is not a typhoid fever, in the cases which we have had come down from the mining camps; neither is it influenza in the form that we had it during the epidemics of 1892 and 1893 in this state. But this much is unquestionably true, that the patient invariably recovers under quiet, nourishing diet, with stimulants and salicylate of soda in moderate doses, together with antipyretics to relieve the pain.

The main point I wish to make is this: That a purely malarial fever, a genuine typhoid fever, an attack of epidemic influenza, and probably various combinations of these three forms of disease have at different times and in various localities of the state *all* passed current among the people, and perhaps among some physicians, as "mountain fever;" that, therefore, the form of sickness which Dr. A. discusses as mountain fever may be very different from that which is in the mind of Dr. B.

Dr. Geo. W. Miel—I am somewhat reluctant to intrude on the Society the same matter I have brought up from year to year, but having given special attention to it, and having had rather large experience in the disease, I feel somewhat justified in speaking of it. I would like to ask Dr. Wooding if the 200 cases he cites were all of the same nature. Here are two important matters. He treated 200 cases occurring in the southern part of the state, and, as far as he knows, they are of the same nature. I have brought out the same matter in regard to a large number of cases which I have cited from time to time. The second matter of importance is the fact that there was no fatality, nor did there seem to be likelihood of fatality. If you will accept the fact that the doctor is right as to treating 200 cases of the same nature, that ought to be good argument that

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he treated something other than typhoid fever. He also makes the interesting statement that there was no effort made to separate or isolate the patients. Dr. Kahn, of Leadville, cites a number of cases of mountain fever especially observed at the instance of Dr. Solly, and feels that the fever must be called typhoid fever. The fact is mentioned that physicians coming there were somewhat embarrassed in their treatment of this fever for a time, and that the patient usually went over to a second man at the end of a few days, when a temperature was found which compared with that of typhoid fever at that time—103 1-2. If these cases proved to be cases of typhoid fever they were diagnosed erroneously. In what is termed mountain fever in this region—properly remittent fever—the temperature at once takes a jump to an average maximum of 103 1-2 degrees. As surgeon in charge of a railway hospital in the southern part of the state, and also having had a similar charge in New Mexico, I have been placed in a position to observe and care for a considerable number of these patients—some 1,000 in all—of which I have proper record. Some of these patients were sent by local railway surgeons to these hospitals as cases of typhoid-malarial fever, enteric, and gastric fever. Not suspecting malarial influences in this climate, I was at first inclined to regard these patients as suffering simple continued fever; in some instances I suspected typhoid fever, yet I did not make that diagnosis. With further experience and more pronounced phenomena, I found myself clearly dealing with malarial fever—definitely remittent fever. Placed upon treatment for which, these heretofore tedious cases made early and satisfactory recovery, resuming their work, upon the average, in some seven days. These cases were clearly of the same character. I have seen an equal number of patients suffering from mountain fever—remittent fever—in private practice. In 2,000 cases four fatalities occurred. One of these patients I saw as consultant at the last moment. I have made diagnosis carefully and have had no reason to change my diagnosis at the end of treatment, so far as the malarial element is concerned. We have it from south winds. We find this element not necessarily present during the whole season, but it is evident when heat and moisture succeed cold; or, in other words, as I have already said, in connection with south winds.

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Dr. H. R. Bull—This is a question of great interest to me. I remember Prof. Da Costa, speaking of typhoid fever, told us that mountain fever was a mild form of typhoid, and when I commenced to practice in Colorado I expected to see a lighter form of typhoid fever. I have been disappointed. In the western part of the state, where the altitude is low, we have the regular form of typhoid fever, with its eruption, distention of the bowels, the characteristic temperature, and even perforations; and I have been looking a long time for mountain fever. It seems that no one has been able to give us the pathology of this trouble, as in other diseases. We know something of influenza; we know something of the pathology of malarial fevers in their various forms of typhoid fever, and so on; but no one has ever been able to place this mountain fever, and tell us what it is; and I would be very glad to see a few cases of it. It is perhaps because I have lived at a lower altitude in my portion of the state; but I have never seen any of the cases referred to here. Where we drink more or less water from the irrigating ditches in the western part of the state, without boiling the water, we have a good deal of general typhoid fever, running from two to six weeks, or eight weeks. We also have cases of abortive and febrile typhoid, which run varying courses; but I have never seen a case of mountain fever.

Dr. Wm. J. Rothwell—My practice has been wholly in the West. I have never observed any fever which could not be classed either as simple continued fever or as typhoid fever. The so-called mountain fever from which the trappers of the West suffered was a fever of long duration. William A. Hammond, as stated in Hartshrue's Practice of twenty-five years ago, while stationed in Colorado, made several autopsies on victims of this fever, and found in all the characteristic typhoid ulcers. We are justified, therefore, in claiming that the low fever of long duration encountered in the Rocky Mountain region is a true typhoid.

The gist of the recent papers read before this society is to show that there is a fever of uncertain duration and symptomatology differing from both typhoid and simple continued fever, which is called mountain fever. There may be such a fever. Papers to be of any scientific value must aim at differentiating

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this fever from both simple, continued and typhoid fevers. I hope that those who believe in the existence of such a fever will not relax their efforts until its characteristics are so clearly defined that we shall all be able to identify it.

Dr. Kahn—I would like to ask Dr. Miel what his specific treatment for this mountain fever is.

Dr. Miel—I am glad to have the question asked, because my treatment has become established—at least it seldom varies. In mountain fever, as in any other fever, I first give attention to the intestinal tract; if the patient is constipated I give a purgative of some kind, mercurial cathartic, and that has been usually two compound cathartic pills, given at bedtime, prefer ably, that sleep may facilitate their retention. I depend upon quinine and use bisulphate, because it is more soluable than sulphate, and less bulky; this is a matter of great importance when dealing with weak stomachs. In aggravated cases, the dose would be ten grains with five grains of Dover powders, and a mite of ginger, given in capsules; usually I get along with about half these amounts in ordinary cases, the dose given after each meal and at bedtime, or upon an average of every four hours. It is necessary to prepare the stomach sometimes. I like to begin the treatment at night. My patients usually respond to this treatment. As an instance of too early withdrawal of treatment, I cite a certain case in which my patient was of particularly happy and noisy disposition. He came into the hospital with high fever, in a drowsy and stupid condition; as his fever left his natural disposition asserted itself, and thinking treatment sufficient, it was withdrawn, with result that within twelve hours he lapsed back to his former stupid condition; return to treatment dissipated the fever once more, and we got the benefit of all the popular songs. Again withdrawal of treatment gave the original phenomena. Treatment continued beyond apparent necessity gave recovery.

Dr. Sol. G. Kahn—I think that would have been longer than three or four days—that must have been several days, the singing, etc. I do not know but what the patients in Leadville receive probably the same sort of treatment; that is one of the cardinal points we should look after—the bowels; that is the first and foremost point with all fevers, and I regard quinine

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and salicylate of soda and salol as good, and these are given regularly to a patient. Of course there might be a possibility that our patients are sick longer than at other places. Our physicians are just as good, and our elements, I think, are probably just as good. But I do not see as there was anything that was specific, or why the patients anywhere in any other part of the state should get well quicker than they do in Leadville, and upon the same treatment.

Dr. Geo. W. Miel—I do not wish to be misunderstood in the matter; I aimed to lay stress on it. This was in the experimental stage; the treatment of three days was not sufficient; it should have been continued a little further. I said with emphasis that in cases of this kind treated by me within the past ten years, this treatment has enabled me to return the patient to work, upon the average, in seven days.

Dr. B. F. Wooding—The only thing I had in view was that we might stop calling the continued fever, or mountain fever—whatever it is—typhoid fever. I believe they are two distinct diseases. I have never seen a case of typhoid fever that was not quite pronounced, and I have never seen a case of ordinary mountain fever that after a few days' attention could not be easily seen to have nothing to do with typhoid fever. In the way of pathology, pathological lesion, and so on, I don't believe there has much been done. It requires a great deal of study and a great deal of time and attention; and we have not found any one who cares to go into that.

THE RECENT EPIDEMIC OF TYPHOID FEVER AT THE COUNTY HOSPITAL, DENVER, WITH REPORT OF CASES.

H. W. McLAUTHLIN, M. D., DENVER, COLO.

Seldom is an outbreak of typhoid fever so extensive and at the same time so distinctively circumscribed as the one forming the subject of this paper. It occurred in February and March—months in which typhoid is infrequent, and at a time when there had been no known case of the disease in the hos-

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pital for some months, and when throughout the city there were only a few isolated cases, while nothing like an epidemic had occurred for several years. It was confined almost entirely to the officers and employes of the hospital, nineteen out of about forty being attacked, while several others seemed on the point of breaking down, as indicated by general malaise, more or less fever, and by their general appearance. The 150 patients escaped entirely with the exception of two. Those attacked neither ate, slept, nor worked in the same buildings. These facts, with the further one that a careful investigation by the state, county, and city health officers, aided by the hospital staff in general, failed to find the real cause of the outbreak, all tended to make the epidemic of intense interest to physicians as well as to the city at large.

Nearly all the cases came at first under the care of the writer, who was on duty at the time, but it soon became necessary to call Dr. Whitney and Dr. Fisk into service, and during the height of the trouble they attended most of the cases, while the writer was transferred to executive work. Dr. Munn attended one case, the hospital seamstress, at her residence, while another, a porter, was attended by Dr. Sewall.

The onset of the cases was as follows, dating from the time of going to bed.

February 22, one.
February 23, one.
March 1, one.
March 2, three.
March 5, two.
March 7, five.
March 8, one.
March 10, two.
March 11, one.
March 13, one.
March 14, three.

In all, twenty-one cases in as many days. This list comprised two children of the superintendent, the chief resident physician, one assistant resident physician, the chief nurse and eight pupil nurses, three porters, two laundry girls, the hospital seamstress, and two ward patients. As the time of incubation of typhoid is variously estimated at from seven to thirty days, and is known to vary with the susceptibility of the individual, it is not unreasonable to suppose that all these persons may have become infected at about the same time.

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Building No. 1 is a ward building for patients. One of the two ward patients already alluded to was in this building. He was in bed at the time convalescing from a tuberculous pleurisy. Building No. 2 is the old hospital building. It is used for wards and has besides the general office and the patients' dining room. The porters sleep in the attic of this building, and at that time the hospital seamstress had her sewing room here, in which she passed her whole time, during the day, aside from going to building No. 4 for her meals. She slept away from the hospital. The other of the two patients who contracted typhoid, an insane woman, was in this building. Building No. 3 contains the general kitchen, the dining room of the general help, including the porters and laundry girls, as well as the sleeping rooms of the latter. In the basement are the laundry and the refrigerators or ice rooms.

Building No. 4 is the nurses' home. Here the superintendent's family lives and the resident physicians and nurses eat and sleep. The superintendent's children, one of whom was the first attacked, were attending public school, and consequently at home but little.

On beginning to investigate the outbreak, the thought naturally suggested itself that the cause would be found in something that could effect the employes and not to any great extent the patients. It was found that while the patients drank the city water as drawn directly from the pipes, the water the employes drank was passed through Pasteur filters, and was then put in jars or tanks throughout the establishment, where it was kept cool by artesian ice, which was not, however, in contact with it. The filters had been properly cleaned each day, but nevertheless the filtered water and the filters themselves were examined for typhoid bacilli by Dr. H. C. Crouch, the city bacteriologist. The results were negative. It was found that the butter used by the employes was from a different source than that used by the patients. That butter was from the Littleton creamery, and an investigation was consequently made of that manufactory. This showed that the butter is made in large vats, and that it would be impossible for a small portion to become infected and the remainder not. The water used is artesian, while inquiry among the

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Littleton physicians revealed the fact that there had been no known case of typhoid among the ranchmen supplying the creamery with milk, nor, indeed, in that vicinity. Moreover, the butter was sold in the best resident portion of Denver, without other cases developing.

The milk for both hospital employes and patients is obtained from the county farm. There is no difference in the milk furnished patients and help, nor in the manner of serving it, although an examination of the conditions at the farm was made with negative results.

The plumbing of all the buildings was thoroughly inspected and reported on by the city plumbing inspector, under the direction of Dr. Munn, health commissioner. The defects found were of a minor nature, with the exception of the refrigerators already alluded to. These were not properly ventilated, while a floor cesspool received the waste water from the ice boxes and also that from washing the floors. Whether or not sufficient water remained in the cesspool to prevent the escape of sewer gas was entirely a matter of chance, as no attention had been paid to it, and no allowance made for evaporation. The fact of insufficient ventilation of the refrigerators made this condition still more dangerous. In the refrigerators were kept the food for the whole establishment, including milk in open cans, butter, meat, and so forth. Recently a modern sanitary refrigerator has been built in their place. Although the condition of these refrigerators was certainly unsanitary, it nevertheless seemed to the committee impossible to find here a sufficient explanation for the sudden and temporary outbreak of typhoid. The investigation included certain articles of food, like celery and oysters, which have been known to communicate typhoid, and which would have been more likely to have reached the employes than the patients.

It was found that when such articles were used they were obtained from the large city markets where it was impossible to further trace their source, although no other cases seemed to have arisen in this way. Once delivered at the hospital, all food is usually consumed within twenty-four hours.

It was suggested that the possible explanation of the infection of some article of food lay in the fact that a new house-

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keeper had been recently employed, who came to the hospital after being ill and who, after staying several days, was taken much worse, was removed to her home, and finally died. The death certificate stated that she died of typhoid pneumonia; but one of the physicians who last saw her felt that she had died from typhoid fever. Accordingly, with the consent of the friends, the body was exhumed, and Drs. Axtel and Freeman made a post mortem examination, which proved conclusively that she did not die of typhoid, but of some brain trouble, the nature of which could not be ascertained, as they were not allowed to open the skull.

The question of how the epidemic arose still remains unanswered, although there is a strong probability of its having been connected with the food.

Let us now study some of the general characteristics of the cases, and then consider a few cases in particular. An examination of the clinical charts, all of which were kindly allowed me for inspection by the several physicians, shows the following facts: Of the twenty-one cases four were severe and two of these died. Seventeen cases were mild, although some of these had a high evening temperature—say 105 degrees—for a few days. The average duration of the cases was about twenty-one days. The longest case was thirty-five days to the commencement of convalescence, and the shortest was fourteen days. Relapses occurred in about one-half the cases Rose spots and an enlarged spleen were present in nearly all.

Diarrhoea, not marked, was present in five cases; constipation in most of the others.

Tympany and abdominal tenderness occurred in about one-third.

Hemorrhages from the bowels occurred in one case.

Of complications, one case developed pleurisy, one convulsions, one during convalescence came down with measles, while one was hysterical.

The following were cases of especial interest:

Case No. 1—Dr. G., chief resident physician, age 26, was the second person to give up, after having felt ill for one week. There was intense headache with general aching. The temperature quickly became high, ranging from 104 degrees to 106

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degrees, without remissions, during the first week. During the second week it was somewhat lower, with morning remissions. In the middle of this week there were hemorrhages from the bowels, the first one occurring on the ninth day after going to bed. By the middle of the third week the temperature had fallen to 102 degrees at night, while his general condition was extremely good. At this time, after exposure to a cold wind from an open window, he developed a left-sided pleurisy. There was much pain, abundant friction sounds, while the temperature rose to 105 degrees. Within three days the typhoid symptoms became more aggravated than at any time previous. Hemorrhages recurred, while at the same time he developed diarrhœa, tympany, subsultus, and delirium. The pulse rose rapidly, ranging from 150 to 175 for two days before his death, which occurred March 18, in the middle of the fourth week, and eight days after the complication and aggravation of the symptoms arose. Dr. Whitney was in consultation in the case.

Case No. 2—Miss K., chief nurse, age 31, of a neurotic family, went to bed on March 2, with an evening temperature of 102 degrees, having felt poorly for two weeks. The temperature gradually rose to 104 degrees at the end of the first week, with well marked morning remissions. There was headache, sleeplessness, some abdominal pain and tenderness, with characteristic typhoid stools. Her condition now became distinctly worse. The temperature remained sustained between 103 degrees and 105 degrees, a talkative, active delirium came on, coma-vigil, apparently some hypostatic pneumonia, and she became much distressed by the rapid formation of gas in the stomach, especially after taking nourishment. The use of cold, in the form of sponging, caused chilling and most disagreeable nervous symptoms, while invariably the temperature rose after it. Sponging with alcohol was well borne. Near the end of the second week she became more quiet and showed the characteristic mental dullness of the disease, making such a marked contrast with her previous condition as to be distinctly noticed by her attendants. On the morning before she died she had considerable difficulty in swallowing, which was attributed to the dry tongue and throat, and which

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improved as the day advanced. Her temperature through the day was between 103 degrees and 104 degrees; pulse 102, and respirations 36. Soon after midnight, without warning, she was seized with convulsions of a tetanoid character. The temperature rose rapidly, reaching before death 107 degrees. The convulsions were terrible to witness, involving especially the muscles of the back and extremities. Peripheral irritation increased their violence. Under the influence of chloroform and other medication they ceased, and she aroused sufficiently to recognize her name and to take some milk, which she took quite readily. A short time after, during another convulsion, she died.

An autopsy was held the afternoon of the same day by Dr. Axtell, pathologist to the hospital. A number of Peyer's patches were found inflamed, and three well-marked ulcerations, with eroded edges, existed near the ileo-caecal valve. There was no perforation. The intestines were filled with typhoid fecal matter. The examination of the brain revealed nothing abnormal beyond excessive anæmia. Dr. Whitney and Dr. Eskridge were called in consultation in this case. Convulsions are extremely rare in typhoid fever, especially in adults. Osler, in his latest work, speaks of having seen but one case. In this they came on suddenly on the eighth day, and the patient died in twelve hours. Thrombosis of the pia mater on the left side was found. Pepper's System states that convulsions, though rare, may occur, and that recovery is still possible. What caused them in this case? It could hardly have been high temperature alone, as at 9 p. m., three hours before the convulsions, the temperature was only 102.4 degrees, while at midnight, thirty minutes before the convulsions, it was only 104.8 degrees.

Probably the easiest explanation is to be found in the toxines which developed incidental to typhoid in a person with a peculiarly susceptible nervous system. Allow me to digress sufficiently to testify to the excellency of character and to the ability of these two chief officers of the hospital, who fell victims to this unfortunate epidemic. The entire staff will gladly support this testimony.

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Case No. 3—Mrs. D., about 40, was a patient of Dr. Pershing's, in the department of mental diseases, suffering from paranoia. She had been extremely suspicious, disagreeable, and hard to manage. For several days after coming down with typhoid, she was troubled with electrical wires which she insisted were in the corner of the room and were influencing her. As the disease advanced, she became more tractable than at any time since she had been insane, and Dr. Pershing states that the improvement in the mental symptoms has persisted since recovery from the fever, which lasted between two and three weeks, and was followed by a distinct relapse.

Case No. 4—D. M., age 28, a patient of Dr. Whitney's, had been in the hospital three weeks. He was tuberculous. There had been an up and down temperature, at first remittent, but later slight and intermittent, after the left side of the chest had been aspirated and twenty ounces of serous fluid drawn off. Then came the rise of temperature step by step, so common in typhoid, until at the end of ten days it reached 105 degrees, after which it gradually declined, followed by a distinct relapse. The case was seen by several members of the staff and the diagnosis was unquestioned. His health is said to be better than before the fever.

Case No. 5 was also a patient of Dr. Whitney's, although seen in consultation by Dr. Fisk and the writer. She was perhaps the most dangerously ill of any who recovered. The first day after going to bed her temperature reached 104 degrees, and this was the lowest point reached for over a week, while most of the time it was 105 degrees. It then gradually fell to normal, followed by a distinct relapse. This patient had a peculiarly quick and weak pulse. On the second day it was 130, and much of the time it was between 130 and 140. There was also a very considerable amount of bronchitis, and diarrhoea was quite marked during the second and third week. Curiously enough, during her convalescence she came down with measles, which ran the ordinary course, the pulse again reaching a rate of 140. Altogether she was sick about nine weeks.

While the epidemic was in progress certain prophylactic measures were carried out with the employes as far as possible —viz., boiling the milk and drinking water, and the routine ad-

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ministration of tincture of nux vomica and dilute hydrochloric acid. Especial care was exercised with the stools and clothing of the sick. In closing I wish to bear testimony to the praiseworthy fortitude exhibited by both nurses and resident physicians in remaining at their posts or by supplying the places of those who were sick, in the face of a dangerous and unseen foe.

DISCUSSION.

Dr. J. T. Eskridge—In regard to the nervous symptoms presented by one of these cases, the chief nurse: It was the first case of typhoid fever in which I have seen convulsions of a tetanoid character present. I was called about 2 o'clock in the morning. The convulsions then had been in existence for nearly two hours, and were almost continuous, especially in the muscles of the back and of the posterior portions of the legs. As I entered the room a convulsion occurred. It was tetanoid in character and at times a spasmodic contraction of the respiratory muscles occurred, so that the patient became cyanotic. Cutaneous hyperaesthesia and muscular irritability were so pronounced that when I touched one foot a convulsion immediately occurred. It was in every particular so like the convulsions seen in strychnine poisoning that I suspected this condition at once. I had had a consultation with Dr. McLauthlin during the previous day, and had suggested giving citrate of caffeine. I feared the druggist had put in strychnine instead of citrate of caffeine. Dr. Hayden and I examined the suspected capsules, but no strychnine was found. The convulsions continued with occasional remission for about an hour after I saw her, when the patient died from spasm of respiratory muscles. At the autopsy the next day the brain was carefully examined, but no evidence of disease was found. I regret now that the brain was not kept, hardened and sectioned, as we might have found what I think probably existed before death—multiple thrombi. I am inclined to think, in the light of the case reported by Dr. Osler, in a recent number of the Journal of Nervous and Mental Disease, that multiple thrombi had occurred, probably affecting the nutrient vessels of the pons. The irritation seemed to be in the region of the pons. In the Journal of Nervous and Men-

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tal Disease, Osler has reported a case of typhoid fever that died from convulsions that were tetanoid in character. The convulsions were relieved in the morning by chloroform, but in the afternoon they recurred, and the patient died. The convulsions were more marked on the right than on the left, and at the autopsy several large arteries were found occluded.

THE ASSOCIATION OF APPENDICITIS AND TYPHOID FEVER.

J. N. HALL, M. D., DENVER, COLO.

Two cases which I have recently treated have led me to look up the matter of the association of the two diseases mentioned. I do not find the complication of one of these diseases with the other, or their successive appearance in the same case, mentioned in any one of a dozen recent text books upon practice which I have examined, although the relationship mentioned should cause no especial surprise.

Case 1—B., male, 28 years old, ranch superintendent, of robust health, weight 220 pounds. About fourteen, eight, and two years ago, respectively, he had three attacks, supposed at the time to be intestinal colic, but accompanied with long continued pain and vomiting. It seems likely now that these were attacks of catarrhal appendicitis, although such a diagnosis could scarcely have been made at the times mentioned, for recovery was apparently more prompt and complete than we should have expected.

On April 24, the patient complained of abdominal pain, vomiting in about five hours, and suffering so much afterwards as to demand morphia hypodermically. Although temporary relief was obtained, it was necessary to repeat the dose about five times during the next forty hours. Tenderness had meanwhile developed in the right iliac fossa, especially over the McBurney point, while the whole lower abdomen was somewhat tender. Catheterization was required. At this time he

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was seen by Dr. Parkhill, and at once moved to St. Luke's Hospital.

On the 27th he vomited all day, and looked very ill indeed. Decided tumor in right flank. The temperature had varied from 100 to 103, pulse from 100 to 130. On the 29th, after consultation with Dr. Mager, Dr. Parkhill operated, evacuating about six ounces of very fetid pus. No attempt to remove the appendix was thought advisable. During the next twenty-four hours, considerable reddish serous fluid was discharged from the tube, fecal in odor, and mixed with pus, feces and detritus. For six days the temperature ranged from 99.5 to 101, although it once reached 102, and once 102.5. The pulse averaged about 110, and was dichrotic during much of the illness. The tongue remained covered with a white, dirty coat, and was dry in the center much of the time. On the fifth day after operation, he was given magnesium sulphate, and on the sixth and eighth days, calomel followed by the salts. Slight improvement was noted as regards the tongue, but, following the last medication, two of the four loose stools contained blood, a few ounces in each. Feces were still discharging through the wound, and a little blood appeared each time with the discharge.

Nose bleed had been occurring daily for a week or so, and examination at this time revealed about twenty-five rose spots, not wholly characteristic, but as much so as we find in many mild cases of typhoid. They covered especially the upper abdominal zone, and the lumbar region. The splenic area was distinctly enlarged, but the spleen was not palpable. Facies decidedly typhoidal.

He was kept on a liquid diet, given dilute hydrochloric acid, and cathartics were avoided. On the fourteenth day after operation, the temperature reached 99 in the morning, and the tongue was nearly clean. He was permitted to eat, unwisely as we now look at it, some soft-boiled eggs. The temperature reached nearly 101 that evening, he had considerable abdominal distress, and his tongue became coated about as before. On the next day he had a hemorrhage from the bowels, estimated at more than half a pint. A little blood came from the wound, which still discharged feces, at the time

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of this bleeding, showing that the blood certainly came from the bowel above the region of the coecum, and not from the large intestine. On the next day the temperature reached 102, and the patient looked worse than at any time during the illness. Sordes reappeared upon the teeth.

From this time there was a gradual fall of temperature until, on the twenty-fifth day, it became normal, and remained so. Recovery was uneventful. The patient lost about sixty pounds of flesh, for, after two weeks of convalescence, he weighed but 168 pounds.

The absence of any long continued diarrhoea in this case does not in the least weigh against the diagnosis of typhoid with me, for in 108 cases occurring in private practice in this state, which I reported to this society, some seven years ago, diarrhoea was present in only about one-half.

In addition to the physicians already mentioned in connection with this case, Drs. McNaught, Hopkins and Fish saw it, at various times, and coincide in the statements and opinions given. The diagnosis of mild septicaemia was, of course, carefully considered, and, we believe, excluded.

Case 2—This case is much less decisive as regards the diagnosis of appendicitis, but is reported in connection with the first for what it is worth:

Mrs. L., about 30 years of age, without previous history of interest, complained July 7 of malaise, constipation and coated tongue; temperature 100, pulse 80. She remained in much the same condition until the 11th, when she presented tenderness over the McBurney point, tumor in right iliac fossa, a temperature of 100 to 101.2, and pain requiring several doses of morphia. Dr. C. K. Fleming saw her at this time in my absence, and concurred in the diagnosis of mild appendicitis.

From this time on the symptoms referable to the appendix became less pronounced, until, on the 14th of the month, the tumor was decidedly less prominent, although still to be made out. The fever became daily more severe, reaching on her eleventh day 103.8 degrees; pulse 90 to 94. Enlargement of the spleen, rose spots, gurgling in right iliac fossa, and typhoidal facies now came on, and she finally passed out of my care, a typical case of moderately severe typhoid fever.

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If the possibility of the occurrence of typhoid be borne in mind, symptoms inexplicable while an operative case of appendicitis is apparently doing well so far as the local condition is concerned, may be properly interpreted. In the treatment of the last quoted case, the complication required no change in the treatment from what would have been employed otherwise, or if the two diseases had occurred separately; in the former case, the increase in diet and the cathartics, possibly, would have been avoided if we could have known at that time all that we now know concerning it.

DISCUSSION.

Dr. W. W. Grant—This case is an interesting one, and especially so on the association, as it is claimed, of typhoid fever with appendicitis. It is a fact about which much has been written, of the mistaken diagnosis of appendicitis with typhoid fever. I know in two papers read before this society four years ago and one year ago, I alluded to this fact of appendicitis not infrequently being taken for typhoid fever and so treated, and of patients who had supposedly died from typhoid fever, when in reality the disease was appendicitis. In this case there was no question as to appendicitis being present, as reported by Dr. Hall, because the operation and abscess showed unmistakably that it was a case of genuine appendicitis. I doubt very much the complication of typhoid fever. It is certainly a very rare condition, and the loss of flesh is as hard to account for from typhoid fever—sixty pounds—as from appendicitis. In fact, I should say that it was easy to account for it from septicæmia, and I judge the case was appendicitis with septicæmia and consequent rapid loss of flesh; that it is entirely probable that the doctor had in that case what is known as small pocket abscess, and that this in contact with the ileum or cœcum produced by ulceration the hemorrhage that he spoke of; at any rate it seems to me the more rational explanation—that is to say, it was a case of septicæmia in connection with appendicitis. It is an exceedingly interesting case in any event, and the society is certainly indebted to Dr. Hall for reporting a case so excellent in character.

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Dr. J. N. Hall—I have only to say that the question of course came up as to whether this process could be septic, and it was gone over carefully; because the operative wound was doing so well we felt it was probably not septicæmia, and nevertheless I mentioned, and took pains to do so, that there was some blood from the operative wound at each one of the three hemorrhages which occurred from the bowels.

Dr. W. W. Grant—Is it not a common thing to have it discharge pus for twenty or thirty days?

Dr. J. N. Hall—Yes, sir; that was probably not mentioned as fully as it might have been; although I mentioned it to Dr. Grant at the time we talked of the patient's condition. We could not believe it was septic. I omitted one point to clinch the diagnosis of typhoid fever in my own mind, and that was that the patient, with every attempt to increase the diet, brought on his trouble again, as we have often seen it when we increase the diet before we ought to; and further, the temperature went up with the coating of the tongue, and with the last hemorrhage the blood followed within less than twenty-four hours after increase in diet, and more or less abdominal pain.

I have aimed to dispose of the criticism made by Dr. Grant, and have to beg leave to differ with him as to the exact cause of the trouble.

THE RELATION OF THE PHYSICIAN TO SOCIAL, EDUCATIONAL AND MORAL QUESTIONS.

E. STUVER, M. D., RAWLINS, WYOMING.

Man's greatest happiness in this world will only be attained when he becomes perfectly adjusted to his environment. While this ideal state will probably never be reached, still all should assist in trying to secure it.

In order to carry any work or undertaking to a successful termination, it is necessary to understand the great principles on which it is based; the conditions that assist or retard

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the successful application of these principles; the natural impediments or artificial obstructions to be overcome; and, lastly, the best means of attaining the desired results.

In my opinion the principal element in the promotion of human happiness and well-being, as well as the elevation of the race to a higher and better plane, consists in the harmonious and symmetrical development of all the powers of man's being—that is, such a development as will give him a strong, well balanced physical organization, keen, thoroughly trained intellectual faculties, and a fully developed moral nature; in short, such an evolution of all the powers of his being as will not only give him complete self-possession and enable him to adjust himself to the many and complicated conditions of his environment, thereby insuring his own happiness and well-being, but will at the same time make him the unwavering champion of justice, truth and right, and will so cultivate his altruistic sentiments that it will be a pleasure to him to extend a helping hand to his less fortunate brothers and to uphold everything that is a benefit to society and the state. What constitutes real social and racial advancement is one of the most intricate and important questions that can engage the attention of man; and the physician, who has ever been the conservator of the well-being of mankind, is vitally interested in its correct solution.

We are living in an age of great unrest and almost incessant change. The wonderful mechanical inventions and marvelous material development of the last century have greatly changed man's relation to his environment. These changes have not only disturbed long established occupations, and interfered with the livelihood derived from them, but by rendering the means of existence uncertain and precarious, have produced a mental and moral instability and vacillation which are reacting very unfavorably on our people.

The remarkable increase of our population and the almost boundless wealth of our natural resources have so dazzled and enthused many that they either cannot or will not see the evils in our social and political institutions and the dangers which threaten the health, integrity and well-being of our people and the stability of our nation.

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That there are tendencies to degeneration and some very strong ones, too, in our present civilization, no one competent to form a correct opinion will, I believe, deny. Whether these tendencies will become *dominant*, and lead to our downfall, the future alone can reveal; but much will depend upon the manner in which they are dealt with. Dr. Max Nordau, in his work, "Degeneration," has very clearly and graphically shown the influence these tendencies have exercised and are still exerting in the spheres of literary and artistic activities. Notwithstanding his conclusions have been violently assailed, and he has been made the object of much personal abuse by many critics, especially the so-called litterateurs themselves, his work contains much truth, and has in the main been sustained by many of the most eminent neurologists and psychiatrists of the age.

We all know that many social problems of great importance and far-reaching consequence to the welfare of humanity are being earnestly considered and discussed by the greatest philosophers, educators and humanitarians of the age; and if the medical profession desires to retain the well earned pre-eminence it has enjoyed since the most remote times, in all philanthropical and humanitarian work—i. e., in promoting the greatest happiness and well-being of the race, it is necessary not only that we prepare ourselves to relieve suffering and combat disease, but that we go deeper and search out the causes that are producing physical ills, intellectual perversions and moral obliquities; in short, that we try to obtain a clear comprehension of the causes producing social disorders and the prophylactic and curative measures necessary for their prevention and cure.

Let us now briefly consider some of these evils.

Everyone, and especially the physician, is familiar with the devastation produced by the wide-spread use and abuse of narcotic and stimulating poisons. We frequently see the shattered wrecks of once powerful bodies and splendid intellects whose possessors instead of attaining high and honorable positions in the world and helping to elevate humanity to a higher plane, fill untimely and nameless graves, brought low by *King Alcohol*, *King Morphine*, or some other over-mastering

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passion or vice. I have often thought that physicians by their too general, indiscriminate and careless use of alcoholic liquors, morphine and other powerful narcotic poisons, were directly responsible for much of the misery and crime which result from the use of these agents; indeed, I am convinced that notwithstanding their great power for good in many cases, when all their effects are considered, they have done much more harm than good, and that a great restriction of their use would be an incalculable benefit to humanity.

We have good reason to be proud of the scientific investigations which have demonstrated the causes of diseases, built up a sanitary science, and so educated public opinion that not only have the plagues of by-gone ages been stamped out or confined to their home in the Orient, but small-pox has been robbed of its terrors (save in communities ruled by anti-vaccination cranks), and many contagious and infectious diseases, being better understood, are much less virulent than heretofore. This being true, how is it that our people tolerate in their midst, without imposing any restrictions on their spread, a class of diseases whose ravages extend from pole to pole and encircle the earth; which attack all ages, from the youngest infant to the oldest man or woman; which invade all classes, from the haughty millionaire to the most besotted tramp; which lay their blighting touch on the proud beauty and the perfumed dandy of the exclusive *four hundred*, as well as the humblest artisan in the land, and bring many of their victims to the lowest depths of suffering and degradation. Nor does death itself bring down the curtain on this scene, for the unhappy victims transmit the blighting effects of their malady to many generations of the future.

Nearly every one in a civilized community has been taught to regard human life as one of the most sacred things in the world. We are frequently horrified to hear of the brutal and bloodthirsty acts committed by savage and barbarous peoples. A short time ago the indignation of the whole civilized world was aroused by the atrocities of the Turks against the Armenians. But I tell you, my friends, there is right in the midst of our own civilized land, I might say in the very shadow of our churches, a species of murder being committed that

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ought to bring the blush of shame to the cheek of the most hardened Turk. As every physician very well knows, this offense is not confined to the so-called criminal classes, but has invaded all classes of society and is carrying physical death and moral blight everywhere. Where the Turk has slain thousands, the victims of the abortionist, in the civilized world, could be numbered by tens of thousands. That such a state of affairs is possible, certainly indicates that, notwithstanding our boasted Christianity, our conceptions of correct moral and ethical principles are very vague and indefinite, and that their proper elucidation is imperatively demanded.

That the mad scramble for wealth and social distinction has produced a lowering of our moral standards is brought very forcibly to our attention by the municipal, state and national jobbery, corruption and class legislation which have become so common and notorious that they are dismissed with a passing shrug by the majority of people. In his celebrated stanza Pope very graphically says:

> "Vice is a monster of so frightful mien,
> As, to be hated, needs but to be seen;
> But seen too oft, familiar with her face,
> We first endure, then pity, then embrace."

Unfortunately, when there is the slightest chance of securing a personal advantage or being on the right side of a job, too many people have reached the embracing stage. The dangers of such a state of affairs are fully appreciated by many thoughtful people. In depicting the consequences of a lowered national morality, the learned and brilliant Dr. James T. Whittaker, in a recent address (see Journal American Medical Association, April 11, 1896, page 700), spoke as follows:

"It is never better to compromise with that kind of evil. It is better to starve than to steal, and it is better to die of disease engendered by drinking excrement than to countenance bribery in any form. Physical is never so bad as moral corruption. All history shows that though a plague may desolate, it is immorality alone that can destroy a nation. Rome fell not on account of the plagues, and not on account of the Goths and Vandals, but because of the failure in the crop of Roman children."

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Time will not permit me to consider in detail the many social questions now being discussed and the evils that should be corrected. Suffice it to say that a national bureau of health should be established with authority to supervise sanitary matters and combat disease. Measures should be adopted to furnish our cities and towns with an abundant supply of pure drinking water and to prevent the pollution of streams; to prohibit the sale or use of poisonous, infected or adulterated food supplies; to limit the spread of and stamp out contagious and infectious diseases; to diffuse among the people a clear knowledge of hygienic and sanitary principles which would not only protect them against disease, but also enable them to recognize the horde of medical vampires and sharks that infest the country; to expose the preposterous and lying pretensions of patent medicine manufacturers and other sure-cure fakirs and humbugs that through the ignorance and credulity of the people, enrich themselves by preying on the suffering; and to limit the propagation of the incurably diseased and criminal classes. Then, too, the sweat-shops, the slums, and many of the tenement barracks of the large cities, where disease, filth, degradation and crime exist in their most loathsome forms; where childhood is depraved, manhood and womanhood debauched; all the finer instincts of humanity smothered; and the closing scenes of life surrounded by a halo of infamy and crime; all these should be swept from the face of our fair land and their places supplied by kindergartens, comfortable and healthful homes, and such conditions and surroundings as will enable the inhabitants to perform the duties and fulfill the mission of human beings and honorable citizens.

We have always boasted, and justly too, of our public school system, whose object is to furnish every boy and girl in our broad land an opportunity to secure an education that will fit them for intelligent citizenship and higher living. When, however, we consider, in a calm and judicial manner, the results attained by our educational methods, we find many defects that should be corrected. In the first place, the accommodations, especially in some of the large cities, are entirely inadequate, and thousands of children cannot be admitted to the schools for lack of room. Many of the rooms are poorly

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ventilated and dark, it being necessary to keep the gas burning in some the whole day, which renders them unfit for school purposes. There is much over crowding, many teachers having from seventy-five to one hundred and fifty pupils. Then, too, a large percentage of the teachers of the country have never been properly trained for their work. Only about fifteen per cent. have taken a course of professional training in normal schools (see Forum, April, 1896, page 179), and many lack that thoroughness of education necessary to make them first-class teachers. A large number do not expect to make teaching their life work, but merely a stepping stone to some other profession or calling. Thus it will be seen that while occupying a position of the utmost importance and most far-reaching consequences, the majority of our teachers lack one or all of the requisites for successful teaching—viz., enthusiasm and natural ability for the work, thorough education, and careful professional training. The result of this is, that in many schools, the work instead of being inspired and vitalized by a love for truth and an earnest desire to penetrate and understand the secrets and laws of nature, is dull and mechanical, and consists principally in routine and cramming for examinations, which, as all know, have little real educative value. The great increase, in recent years, of the number of subjects included in our common and high school courses, compels pupils to take too many studies at the same time, thereby creating a tendency to superficial and imperfect work, and the pernicious habit of leaving a subject before it is thoroughly understood. It is very seriously doubted by many of our best educators whether the breadth of culture thus gained is not more than counterbalanced by the loss of thoroughness and mental power which were acquired by students fifty years ago. It cannot be questioned that the pushing, crowding and high-pressure methods to which children are subjected from the time they enter until they leave school, have a very deleterious influence on healthy physical development. I am thoroughly convinced that they are responsible for a large part of the nervous irritation, neurasthenia, and mental instability which unfortunately have become such prominent characteristics of our people. Nor is it strange that such a course of study, com-

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Time w[illegible]ulty dietetic habits, irregular and insufficient time social que[illegible] attendance at balls and parties, and participation in be corr[illegible]s of excitements by mere children, is rapidly making shou[illegible]nation of dyspeptic and semi-invalids, and is bound to act te[illegible]astrously in every way in the future.

Very few people, I believe, fully appreciate how little real, live interest is taken in the proper application of the plainest and most elementary physiological and sanitary principles in the practical management of many schools.

From my own personal observation and some investigation of the matter, I am led to believe that in many schools pupils are restricted in their privilege to attend to the calls of nature, or, if excused for this purpose, are punished by detention or otherwise to make up for the lost time. I regard such a practice as highly reprehensible; it not only causes much discomfort and suffering, but may lead to serious disease.

But, it may be asked, why is the physician specially concerned with these questions?

By his training and wide knowledge of the inherited and acquired tendencies of mankind, his comprehension of the conditions and motives which impel people to act as they do, the physician occupies a position that can be attained by no other class or profession. Nor is it strange that the physician, who is the companion of man from the first inspiration that ushers him into independent existence to the expiratory gasp that closes his earthly career, who soothes his pains, assuages his griefs, and inspires him with hope and courage in his darkest hours, should be made the repository of his most sacred confidences, and exert over him an immense influence.

Who so well as the physician can impart to him a knowledge of the laws of health, and point out the insidious causes of disease and the best means of avoiding them?

Who is more capable of giving him sound advice on the many social and moral questions that appeal to him for solution than the physician, who not only has a greater or less theoretical knowledge of their merits, but every day witnesses the effects of their practical application on all classes of society?

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Who is better able to judge of the value of legislative measures or more interested in the enactment of wise and good laws than the physician, whose success is so largely dependent on the welfare and prosperity of the people?

In what phase of our social activity is the special knowledge and advice of thoroughly competent physicians more urgently needed than in the proper nurture and education of our children?

I think we can justly say that in all of these directions the active interest and hearty coöperation of physicians are of the greatest value.

But, it may be asked, how can these evils be remedied?

As is very well known, all great reforms are of slow growth and require much time for their accomplishment; hence, it is necessary to observe the old Latin motto, "*festina lente*"—make haste slowly—and secure a solid foundation on which to build. To secure such a foundation, we must commence at the beginning and do our work well; and, since prophylaxis is always better than cure, our principal efforts should be directed towards preventing the formation of evil habits and the acquisition of ungovernable appetites.

To prevent the making of one criminal, drunkard or other incompetent is of more benefit to society than to cure five habitués. In the first place it is much less expensive and easier to do; and then, too, many confirmed evil doers are not worth reforming. To protect itself against their depredations, society should confine these irresponsibles in properly managed institutions under the direction of competent scientific experts and entirely beyond the range or influence of political manipulation or maudlin sentimentality. There they should receive the treatment best adapted to their individual conditions and their permanent restoration to useful citizenship. They should not be committed for any definite length of time, but should be kept in custody until they could be safely released. If this were done, and all notices of great crimes and public trials save the barest mention were excluded from the newspapers; if the criminals, high and rich as well as low and poor, instead of receiving gifts of flowers and being lionized by hypersensitive and erratic people, were put to work

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cleaning sewers or other similar tasks beneficial to society, many crimes would lose much of the halo that now surrounds them and become less frequent.

The principal object, however, should be to stamp out evil propensities and tendencies, and protect the young against their influence. To accomplish this the general public, not merely a few people in each community, must be aroused to appreciate the immense importance of the work to be done; they must thoroughly understand that if they desire their children to attain the highest and noblest manhood and womanhood they must instil into their minds correct principles and true ideals of life; they must furnish them with healthful and attractive home surroundings and conditions favorable for a symmetrical and complete development.

The home should be made the most attractive place in the world; young children should be kept off the streets and away from evil associations; their lives should be regulated in accordance with hygiene and physiological laws; correct dietetic habits should be inculcated; they should have plenty of time for sleep, and the long hours of home study imposed by most schools upon young girls at the most critical period of their lives should be either absolutely interdicted or greatly restricted, and in all cases confined to those who are physically able to do the work without injury.

If we desire to banish the appetite for alcoholic and narcotic poisons and stay the ravages of intemperance in all its varied forms, we must begin right down at the bottom and give the officious grandmothers, neighbors, *et id omne genus* distinctly to understand that the new-born infant has some rights which should be respected, and one of these is that it should be protected against alcoholic and narcotic poisons. A single dose of brandy and water given to an infant or young child may do an amount of damage that a whole lifetime of temperance lectures or Keeley cures will not be able to counteract; and the use of soothing syrups, paregoric, laudanum, or opiates in any of their varied forms, has been the cause of many of those saddest of all physical, mental and moral wrecks, the "*morphine fiends*," which have become so very numerous.

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Modern sanitary methods have done much to limit the spread of contagious and infectious diseases. We can quarantine scarlet fever, diphtheria, and send small-pox cases to special hospitals; why, therefore, should not public opinion demand that every case of syphilis in its active or infectious stage should be sent to a special hospital, and kept there until all danger of communicating the disease has disappeared? If this were done, syphilis would not be nearly so popular and prevalent a malady as it is at the present time, and we would be spared the disgusting spectacle of seeing persons with the disease in its most active and communicable stages mixing freely in society and endangering the safety of those with whom they come in contact.

If every physician would impress upon the people who apply to him for such service that the production of an abortion under all ordinary circumstances is one of the most cowardly and contemptible of murders, and would have nothing whatever to do with the infamous practice, we would soon have an improved public opinion on the subject. I do not think many people would deliberately commit murder, and I believe that when they once clearly appreciate the enormity of this offense, it will not be nearly so frequent.

This being the case, it is the duty of every true physician to stand up boldly for the truth; to uphold the dignity and honor of his profession; to point out the physical and moral devastation the practice is causing, and help to raise the people to a higher and better plane.

During the last few years much has been said and written about raising the standard of education in the medical and other professions and some real progress has been made in that direction. What we most need in educational work is a more widespread knowledge of the laws of mental development, a better appreciation of proper educational methods, and less politics in connection with the management of our schools; better pay for the rank and file of teachers, a more thorough education and careful professional training; more enthusiasm and less routine; more original investigation and search after truth for truth's sake, and less cramming for examinations; less talking and lecturing on the part of teachers, and more

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time devoted to training pupils in systematic and logical analysis and in clearness and accuracy of expression.

Such an education, in short, as will enable them to live happy and useful lives and make them benefactors of their race; or, in the words of our own great poet of nature, the immortal Bryant,

> "So live that when thy summons comes to join
> The innumerable caravan that moves
> To that mysterious realm where each shall take
> His chamber in the silent halls of death,
> Thou go not like the quarry-slave at night
> Scourged to his dungeon, but sustained and soothed
> By an unfaltering trust, approach thy grave,
> Like one that draws the drapery of his couch
> About him, and lies down to pleasant dreams."

DISCUSSION.

Dr. E. R. Axtell—We all know that society is radically wrong in many ways. I was interested in the doctor's solution of the question. Personally I believe that we can do something about it. We have to abolish poverty. Poverty is in a sense the root of much of this evil. There are many ways proposed to do this. I see but one way—that is, to teach ourselves, teach our children, and teach one another that interest and rent are wicked; that the man who takes interest—the man who takes rent, is a robber. Teach them, also, that the world does not need these evils. When the day comes that we appreciate this fact—when we have free land (when a man can only own the land that he can use) and free money (mutual banks) we can abolish poverty, and cure many of these evils. Of course, I do not expect to be fully understood.

Dr. Wm. J. Rothwell—The doctor has touched upon a great many points of interest to me, especially the educational interests of our children. Our educational institutions have many good points, but in my opinion they have some serious defects, also.

First—The hygiene of the East Denver high school is defective. The children are allowed but twenty minutes or half an hour at dinner time. They eat a cold lunch or such food as may be obtained for a dime or so at the restaurants close by. This continues for four years of the most important period of

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physical development. Is it any wonder that nervous dyspepsia is found among the graduates?

Second—The cadet corps consists, of course, of the ablest and strongest boys in the school, those least in need of physical culture. The smaller and weaker boys who are most in need of physical training are comparatively neglected.

Third—In my opinion a very serious defect of our educational system is lack of thoroughness. The time allotted to the various studies is too short; the studies too numerous, and often too difficult for the age of the pupil. The importance of training children to master their studies cannot be over-estimated. Much that is called education is stultification. When a pupil is set to translate Cicero's orations before he is familiar with ordinary prose, he is injured by the process.

Our children are hurried from one "ology" to another, and from one Latin author to another. Superficiality is written everywhere.

Dr. Pershing asks why we have so many "isms" and "cranks" at present. I answer, because children are taught a little about everything, but not much about anything. "A little knowledge is a dangerous thing." I am not criticising the teachers. They are in a tread-mill. I am censuring the system. Why is it that many of our brightest men have graduated from a country school? Because their minds have never suffered from that hurrying, cramming process, the destroyer of genius, the enemy of mental growth.

I do not deny that a few of the brightest pupils of each class can keep up with the procession of studies, but even they would be benefited by less "cramming," and more original work.

BRONCHO-PNEUMONIA IN CHILDREN.

J. TRACY MELVIN, M. D., SAGUACHE, COLO.

In looking over the transactions of our annual meetings, our attention is called to the very limited discussion which is devoted to the common, every-day forms of disease with which we most frequently come in contact. But the value of these

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meetings; not measured, to the country doctor at least, by the number of original investigations here reported, nor wholly by the number of rare cases presented, nor yet entirely by the daring and successful surgical operations which our foremost men have been able to do in the well equipped hospitals of the city; but first and foremost by the opportunity which here arises for the discussion of those questions for which he is daily striving to obtain a practical solution, and it is for the sole purpose of arousing such discussion that I propose this subject and offer the results of my own limited experience.

The diseases of children probably comprise one-half of the work of a country practitioner, and these diseases are most often forms of meningeal, pulmonary or gastro-intestinal inflammation of a very constant type.

The gastro-intestinal troubles have received by far the most discussion during recent years, perhaps because they are the most troublesome to our city colleague; but the indications to be met and the means for meeting them are now so generally recognized and commonly accepted that we can say they are settled—at least so far as our unstable profession will allow any subject to be settled.

The treatment of meningeal troubles, on the other hand, appears to be extremely unsatisfactory; and yet in spite of its opprobrious death rate it receives little discussion, while the forms of pulmonary inflammation afford ground for sharp disagreements in too many consultations.

It seems almost unreasonable that the combined experiences of the hundred thousand and more physicians of our country, with their yearly increasing increment of knowledge, cannot be crystallized into a successful and generally accepted formula of treatment for these, the most common forms of disease which come to their notice.

It is wholly unnecessary to confine ourselves to the nice distinctions of diagnosis in this discussion. Practically we recognize the great majority of all attacks of pulmonary inflammation in children as being the same disease process, modified perhaps by little beyond its particular location and severity. It is never easy, and often is impossible, to draw the line where a serious bronchitis ends and a true broncho-pneu-

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monia begins, so insensibly may the one condition pass into the other. Here is a point which I wish to make—that in direct distinction to true lobar pneumonia, broncho-pneumonia is seldom a primary disease. Contrary to the assertions of many of our authors, I believe that a child may be, as we say, "threatened" with this disease, and yet under proper treatment avoid the attack by checking the primary disease. It is therefore of fundamental importance to so treat every child with severe bronchitis that it may not "run into" pneumonia, obnoxious as that phrase is to some of our scientific confreres. When I find a patient whose temperature shows over two degrees elevation, and whose respirations are more than ten above normal, without any other apparent cause than the lung trouble, I am very suspicious of a commencing pneumonia, regardless of the physical conditions found upon examining the chest; and I at once treat the case accordingly, and am satisfied that thereby many cases which another twenty-four hours of waiting would show to be fully developed cases of pneumonia, are checked in their incipiency.

It is the question of treatment, however, which we wish to particularly consider. I am firmly convinced that in this class of troubles active, positive treatment is of the utmost value, and it is time to call a halt upon that growing tendency of medical critics to minimize the efficiency of therapeutic means, and to affect a skeptism of any direct benefit to our patients from positive medication. With the pulmonary circulation engorged and congested, a cutaneous circulation contracted, with a high arterial pressure, a heart each ventricle of which is struggling with a task of unaccustomed difficulty, it would be strange, indeed, if we were unable to give prompt and efficient assistance to the efforts of nature.

In those asthenic cases where there is only a moderate elevation of temperature, where the progress of extension is slow, and especially where the trouble is secondary to a previous sickness, stimulating applications to the surface of the body applied with thorough rubbing and covered by an improvised cotton batting jacket which is to be worn continuously, are of the utmost service in equalizing the circulation. I believe that the application and the jacket should include the entire trunk,

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abdomen and thorax, front and back. Camphorated oil is the standard application in these cases, although I often prefer one somewhat more stimulating.

Digitalis in doses sufficient to maintain a regular and moderate action of the heart, and strychnia, from 1-100th to 1-200th grain four to six times daily, with a stimulating diet carefully enforced, will usually carry these cases through successfully.

But for the great majority of cases of broncho-pneumonia, as we meet them in the country, with high fever, labored and rapid breathing, and engorged lungs, there is, in my judgment, no means which will for a moment rival in prompt efficiency and certain relief the immediate application of the much abused flaxseed poultice. I am aware that in advocating its use I am advocating a return to a position which the profession have largely been induced to abandon. I am aware that for the past fifteen years the pendulum of medical practice has been swinging away from such applications, and yet I believe that it has swung loose from a sure and safe anchorage for the uncertainty of a drifting tide. In our text books of fifteen and twenty years ago there was a strong insistence upon their value in this class of cases, while to-day, that "unspeakable abomination, the flaxseed poultice"—that "consummation of nastiness," and that "antiquated relic of old women," are the most complimentary terms which are applied when writers are obliged to mention it. I will admit that it is entitled to all the opprobrium possible on the ground of inelegance, unseemly appearance, and unpleasant manipulation, but have its critics supplied any measure which will compare with it in efficiency? For several years I avoided its use in every way possible, and tried innumerable substitutes with inevitable dissatisfaction.

But by flaxseed poultice I do not mean a little dab of hot mush dropped somewhere on the chest and changed every half hour as it cools—not at all. I have a generous double jacket of commonest cheese cloth roughly basted together, except one open edge, reaching from the child's neck to the waist. I stir up with boiling water a mixture of two-thirds hops and one-third flaxseed meal, usually adding a little mustard and spice; this is poured into the double jacket and worked around

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until of a uniform thickness of about half an inch; this is then applied directly to the skin, drawing the arms through the arm holes of the jacket, pinning it behind. Then cover with oiled silk, or even a small, light blanket. This should not be changed until it becomes a little dry around the edges—say three or four hours, or even longer. The alleged danger of such a poultice getting cold where it is in any way protected, is, I believe, largely imaginary. Careful tests with the thermometer have shown repeatedly a temperature from two to five degrees higher in the poultice than in the rectum six hours after application. This, of course, is merely a modified continued hot pack, but the best form of its practical application with which I am familiar. Within an hour after it is applied the restlessness ceases, the cough loosens, the pulse becomes stronger and more regular and often the whole aspect of the case changes from despair to hope. This poultice jacket may be continued for two or three days in bad cases, and always is followed by the cotton jacket and inunctions of champhorated oil.

Internal medication must also be prompt and decisive, and adapted to accomplish clearly defined objects.

Minute but repeated doses of calomel are almost certain to be required at the outset of treatment, and some times repeated during its course.

Aconite is the second remedy invariably indicated at the outset of treatment. It dilates the peripheral blood vessels, calms the excited heart, and acts as an anodyne to the headache and muscular pains which are frequently present. It should not be given by any classical rule as to dose, but you should give it for the purpose of accomplishing a direct and positive effect, seeing the patient often enough to know whether that effect is being reached; and having reached it, you can easily regulate the dose to maintain it—the pulse is the unfailing index as to when that result is reached. The too common practice of prescribing a small dose of aconite, a little spirits of nitre, and a little sol. acetate of ammonia, with directions to give a teaspoonful every two or three hours till the fever cools, is, I believe, not a scientific or successful way of administering it.

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In many severe cases every fifteen minutes is not too often to give an appropriate dose of aconite in the onset of this disease, perhaps lengthening the interval to half an hour or more after six or eight doses; but it is very rare that the nurse, unless a professional, can judge when the desired effect has been produced. When the pulse falls to within fifteen beats of normal it is my usual rule to reduce the dose and frequency. Veratrum viride is, in my experience, both unsafe and unsatisfactory with children in this disease.

Digitalis is the third constant remedy. It should always follow aconite in small or moderate doses and sometimes in special heart weakness accompany it, and should always be continued well into the convalescence.

Strychnia is the fourth regular standby, to be given in small granules during the entire course of the disease, in every case.

The positive physiological effect of each of these drugs is so clearly defined that further allusion is unnecessary.

Expectorants, anodynes and coal tar antipyretics are very seldom of any benefit in this line of treatment, and usually will do more harm than good.

Crowding nourishment and stimulants is often necessary and usually beneficial, but we must not forget that assimilation may be unable to cope with the supply if the fever is high, and before the glandular secretions have been stimulated by the small doses of calomel.

In the last government census consumption is given as the cause of the largest percentage of all the deaths in the United States—to-wit, twelve per cent.—while pneumonia in its various forms is second, as the cause of nine per cent. of the total number; so that its efficient treatment is a question of no small importance to the profession.

In a recent work, Dr. Pepper gives broncho-pneumonia a mortality of thirty to fifty per cent. in children—a mortality which is greatly in excess of that which should be experienced in private country practice under any rational treatment; and I believe with the outlined treatment faithfully carried out it

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will be extremely small, my own experience giving but one death from this cause during the past six years; but with expectant, indecisive, or timid treatment it will inevitably be much greater.

THE DIAGNOSIS OF TUBERCULOSIS FROM THE MORPHOLOGY OF THE BLOOD.

AN ORIGINAL RESEARCH WITH REPORT OF CASES.

A. M. HOLMES, A. M., M. D., DENVER, COLO.

It is well known that if the diagnosis of tuberculosis be delayed until it is confirmed by the discovery of tubercle bacilli in the sputum, the most important period has been neglected. When bacilli are found the patient is already in the active state of the disease, and in many cases it is then too late to check it. Therefore, the first step in the prevention of tuberculosis should be an early diagnosis. If this can be done before the active state begins, or at its beginning, many may avoid, or at least delay, the destructive results which otherwise would soon follow.

Authorities quite agree that in tuberculosis there exists a shorter or longer latent, or pre-tuberculous state. This may be inherited or acquired. They also agree that *the leucocytes of the blood are tissue formers.* During this so-called pre-tuberculous period, the body is undergoing retrograde changes. The body tissues are being constructed of the leucocytes of the blood. Hence, it occurred to me recently that, before the disintegration of the gross tissues of the body exists, the blood would show distinct and characteristic signs of a similar nature. And, if so, a study of these appearances could be made a valuable means of diagnosis in this disease. With this in view, I selected a few patients with pronounced tuberculosis, and carefully studied a specimen of blood from each. With each specimen I used absolutely the same technique with reference

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to taking films, fixing, staining, and mounting.* Afterwards, cases with similar blood characteristics were grouped together, and to my surprise I found a remarkable similarity in the histories and clinical symptoms. Hence, these studies have convinced me that *in tuberculosis the condition of the individual can be interpreted from the appearances of the leucocytes of his blood.*

Whether the tuberculous condition be inherited or acquired, we find in such persons a tendency to a more or less extensive tissue disintegration. In tuberculous blood I have found cell disintegration abundant, and especially so in young and middle aged leucocytes. Hence, the fundamental principle upon which this thesis is constructed, is the hypothesis that *every individual has a biological prototype in the leucocytes of his own blood.* What is true of the larger organism is true of the smaller. What is true of man is true of the leucocytes of which man is constructed. And, conversely, what is true of the cell is true of the individual.

The laws of life are universal. There is no break in their continuity. They vary in degree and not in quality. There are degrees of simplicity and complexity, according to the level upon which the particular organism rests, with reference to its evolutionary ascent. From the primordial, non-differentiated, homogeneous protoplasm of the protozoon, and from the protozoon to homo, vital laws present an unbroken continuity. They do not exist in the cell and cease in the individual. They do not exist in the individual and cease in humanity. But, the laws of sociology are the laws of biology, and the laws of biology are the laws of the cell. Hence, upon this hypothesis, I shall attempt to show a relation; of diagnostic value, between certain morphological appearances in the leucocytes of the blood, and certain conditions in the patient. For this purpose, I shall attempt to show certain

ANALOGIES BETWEEN THE LEUCOCYTES AND THE INDIVIDUAL.

Analogy in Growth and Decay—It is the opinion shared by the majority of observers—Uskow, Gullard, Ehrlich and others

* It would require too much space to enter into the technique in this paper. At some future time I propose to devote a paper especially to this subject.

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—that the various forms of leucocytes are mere stages, or transitional forms in the life history of the cell.

As the child develops by insensible stages to maturity, and then declines, so the stages in the life history of the cell pass insensibly one into another. The characteristics which point to the growth of leucocytes, and from which their ages may be approximately ascertained, are based upon two important phenomena: First, a differentiation or division of the nucleus; second, the appearance of granules in the cell protoplasm.*

First—As a young leucocyte develops, the nucleus attempts to divide. It first changes from the spheroidal or oval form, by extending a portion of itself in various directions. These are characterized as "transitional forms." As the cell continues to develop, many of these nuclei completely divide. The cell then contains two or more nuclei, and is called a poly-nuclear leucocyte.

Second—A very young leucocyte possesses very little cell body, being almost all nucleus. But as it develops the cell body increases in size. The cell body in young cells is non-granular, but is transparent or basophile. As it develops we soon observe a tendency to granulation—the granules at first being transparent or faintly basophile. In health they develop in the cell protoplasm simultaneously with the characteristic transitional changes in the nucleus. As the nucleus reaches the transitional or poly-nuclear form, the granules become more numerous, and change from transparent or basophile to oxyphile. Hence, in health, oxyphile granules are never seen except in transitional or poly-nuclear leucocytes, or mature cells. When they are observed in lymphocytes or young cells, it indicates a prematurely developed cell protoplasm, or a nucleus endowed with low vitality and unable to divide.

Again, when leucocytes reach maturity and begin to decay, the granules of the cell protoplasm became less oxyphile, and often faintly basophile. Hence, when phagocytes or mature leucocytes are observed with granules which are only slightly oxyphile, or with a basophile tint, we have a cell that is undergoing disintegration—a cell that is returning to its second

* The majority of staining methods are useless in bringing out these characteristics of the leucocytes. Hence, they are of very little value in the study of tuberculosis.

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childhood. Its granules were first basophile, then became oxyphile, and if the cell lives long enough, they again become basophile.

But all cells do not pass through each of these stages. Neither do all children live to maturity and die in old age. As a person may die at any age, so may a leucocyte. As a child with a frail organism rarely reaches maturity, so frail leucocytes often die in their infancy. Leucocytes come from pre-existing leucocytes, and here as well as with the more specialized sperm and germ, the characters of the parent are handed down to the offspring. Hence, if it is correct to claim that an individual has inherited a strong predisposition to disease, it is certainly eqnally true of his leucocytes. For, *as are his leucocytes, so is the individual.*

Analogy in Structure—The histology of the leucocytes, studied micro-chemically, shows that they consist of four tissues: Chromatin and achromatin, tissues of the nucleus; spongioplasm and hyaloplasm, tissues of the cell body. Prof. Ehrlich discovered that each of these tissues gives a specific reaction to stains, and that they react differently in health and disease.

The spongioplasm is a network of delicate protoplasm in the cell body, which surrounds and encloses the globules of hyaloplasm, in the same manner that the skin, mucous membrane, and layers of fascia surround and enclose the larger animal organism and its anatomical parts.

The chromatin is also a network of extremely delicate nuclear protoplasm, which encloses and protects its more delicate tissue—the achromatin—in the same manner that the external membranes of the brain and nerves surround and protect the delicate tissues within them.

Analogy in Functions—Von Recklinghausen and Cohnheim demonstrated that the leucocytes possess distinct and independent functions. They receive food, grow, migrate, construct, generate and eliminate. Hence, we find in them functions exactly analogous to those in the larger animal.

Analogy in Disease—If the physiological processes are analogous, why not also the pathological? In gross pathology, when the tissues are changed in their morphological appear-

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ances, their functions are altered. Hence, when the cell tissues are changed in their appearances and reaction to stains, their functions are also changed.

Analogy in Tuberculosis—In tuberculosis of the individual we find a rupture, or an attempt to rupture the continuity of the enclosing membrane—skin or mucous membrane, according to whether it is surgical or pulmonary tuberculosis. When the membrane is ruptured we find a discharge of broken down or disintegrating tissue.

In tuberculosis of leucocytes an identical process is observed. There is a rupture, or an attempt to rupture the spongioplasm. When this is ruptured a portion of the cell is observed passing out, or has already passed out, leaving a depression in the cell corresponding to the amount of tissue lost. When the spongioplasm has not yet broken, the cell is distorted, with irregular contour, and a portion of the cell protoplasm protruding at various points. Hence, *the law that brings about disintegration in the tuberculous patient, brings about the same process, at an earlier date, in the tuberculous leucocyte.* The cells show all degrees of disintegration, and the blood serum is loaded with debris from these disintegrating cells. With marked disintegration of lymphocytes, or the young cells, we can safely predict adult cells of weakened vitality. Consequently, the phagocytes, or tissue formers, will be feeble and inactive. Therefore, *with marked disintegration in the leucocytes, it is with absolute certainty that we can predict a similar condition in the larger organism.* When this condition exists, the bacilli find a congenial culture medium in which to lodge and develop, with very little resistance on the part of the phagocytes.

Analogy in Percentage—Perhaps the most important analogy is between the leucocytes of an individual, and the individuals of humanity. Each particular class or type, in the normal state, represents a definite percentage of the total number. In other words, each leucocyte, whether infant, middle-aged, or adult cell, bears such analogous relation to the totality of cell aggregation which constitutes the individual, as each individual bears to the totality of individual aggregation which constitutes the more highly complex organism—humanity.

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The statistics of any people will show that there is a fairly uniform percentage of the total population for childhood, for middle age, and for adult life. When these percentages are materially changed,we have reasons to suspect something wrong in the vital economy. The same law holds good among leucocytes of blood. The consensus of opinion among haematologists is quite uniform as to the percentage for each age or type of cell in normal blood. The following is approximately Neudorfer's classification and

PERCENTAGES OF LEUCOCYTES IN NORMAL BLOOD.*

Small lymphocytes, 26 per cent.
Large lymphocytes, 8 per cent.
Phagocytes, 65 per cent.
Eosinophile leucocytes, 1 per cent.

In nearly all pathological conditions there is more or less variation from these percentages. Hence, when we find a marked variation from the above percentages we may be quite certain that we have a pathological condition somewhere in the organism.

The following table, prepared from the cases studied, will show a variation from the normal percentages of considerable diagnostic significance. And, furthermore, a study of the table will also show a comparatively uniform percentage for each type of the disease.

* The method of distinguishing and classifying the varieties of leucocytes will be given in another paper.

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PERCENTAGES OF VARIATION FROM NORMAL CONDITIONS.

No.	Name.	Age.	Percentage of Small Lymphocytes.	Percentage of Large Lymphocytes.	Percentage of Phagocytes or "Neutrophiles."	Percentage of Eosinophile Leucocytes.	Percentage of Myelocytes.	Condition Ascertained from a Study of the Patient.	Condition Ascertained from a Study of the Blood.	Attending Physician.
1	Mr. H.	18	7	17	73	2	⅜	Incipent pulmonary tuberculosis. Little sputum. Few bacilli.	Tuberculous condition marked. Recuperative power good.	Dr. E. R. Axtell.
2	Miss X.	23	13	14	71	2	....	Incipient pulmonary tuberculosis. Very little sputum.	Tuberculous condition fairly well marked. Fair recuperative power.	Dr. F. E. Waxham.
3	Mr. H.	26	16	9	74	1	....	Incipient pulmonary tuberculosis. Sputum and bacilli.	Marked tuberculous condition. Strong recuperative power.	Dr. E. R. Axtell.
4	Miss S.	....	11	11	77	1	....	Incipient pulmonary tuberculosis. Beginning convalescence.	Tuberculous condition well marked. Fair recuperative power.	Dr. H.W. McLauthlin.
5	Miss N.	38	13	12	74	1	....	Strong tuberculous predisposition. Had tuberculosis, recovered and now threatened with relapse.	Tuberculous condition fairly well marked. Strong recuperative power.	
6	Mr. B.	58	9	23	66	2	....	Incipient pulmonary tuberculosis. Severe cough. Very little sputum. No bacilli	Tuberculous condition marked. Two weeks later much improvement.	
	2 wks later		15	12	69	4	....			
7	Mr. C.	27	12	12	74	2	....	Incipient pulmonary tuberculosis. Beginning convalescence.	Marked tuberculous condition. Strong recuperative power.	Dr. S. G. Bonney.
8	Mr. J.	25	12	12	74	2	....	Tuberculous laryngitis. Improving slightly. Little sputum. Bacilli.	Marked tuberculous condition. Slight recuperative power.	Dr. F. E. Waxham.
9	Mr. M.	56	16	13	70	1	....	Tuberculous laryngitis and incipient pulmonary tuberculosis. Very little sputum. Bacilli.	Marked tuberculous condition. Moderate recuperative power.	Dr. Henry Sewell.

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PERCENTAGES OF VARIATION FROM NORMAL CONDITIONS.—Continued.

No.	Name.	Age.	Percent'ge of Small Lymphocytes.	Percent'ge of Large Lymphocytes.	Percentage of Phagocytes or "Neutrophiles."	Percentage of Eosinophile Leucocytes.	Percentage of Myelocytes.	Condition Ascertained from a Study of the Patient.	Condition Ascertained from a Study of the Blood.	Attending Physician.
10	Mrs. F.	25	26	20	51	3	....	Incipient pulmonary tuberculosis. No sputum. Very little cough. Convalescent.	Tuberculous condition well marked. Strong effort to recuperate.	
11	Mr. U.	32	23	16	59	2	....	Pulmonary tuberculosis. Convalescent.	Tuberculous condition moderate. Fair recuperative power.	
12	Mr. M.	32	31	6	63	⅓	....	Pulmonary tuberculosis. Convalescent.	Tuberculous condition slightly marked. Strong recuperative power.	Dr. S. G. Bonney.
13	Mr. X.	....	37	8	53	2	....	Pulmonary tuberculosis. Convalescent.	Tuberculous condition very slight. Strong recuperative power.	Dr. Henry Sewell.
14	Mr. D.	....	32	13	53	2	....	Pulmonary tuberculosis. Convalescent.	Tuberculous condit'n marked. Fair recuperative power.	Dr. Chas. Denison.
15	Mr. E.	23	8	8	81	3½	....	Advanced pulmonary tuberculosis. Abundant sputum. Cavity. Bacilli.	Marked tuberculous condition. Little recuperative power.	Dr. Chas. Denison.
16	Mr. M.	32	7	5	87	1	....	Advanced pulmonary tuberculosis. Large cavity. Abundant sputum. Bacilli.	Marked tuberculous condition. No recuperative power. Granules with basophile tint.	Dr. W. W. Grant.
17	Mr. H.	55	7	16	74	3	....	Pulmonary and laryngeal tuberculosis of long standing. Slightly better.	Tuberculous condition well marked. Slight recuperative power.	Dr. I. B. Perkins.
18	Mr. X.	38	8	10	81	1	....	Advanced pulmonary tuberculosis. Abundant sputum. Bacilli present.	Marked tuberculous condition. Slight recuperative power.	Dr. H. C. Crouch.

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PERCENTAGES OF VARIATION FROM NORMAL CONDITIONS.—Continued.

No.	Name.	Age.	Percentage of Small Lymphocytes.	Percentage of Large Lymphocytes.	Percentage of Phagocytes or "Neutrophiles."	Percentage of Eosinophile Leucocytes.	Percentage of Myelocytes.	Condition Ascertained from a Study of the Patient.	Condition Ascertained from a Study of the Blood.	Attending Physician.
19	Mr. C.	28	8	10	80	1	1	Advanced pulmonary tuberculosis. Abundant sputum. Bacilli present.	Marked tuberculous condition. Slight recuperative power.	
20	Mr. L.	24	10	8	80	2	....	Advanced pulmonary tuberculosis. Abundant sputum. Bacilli present.	Marked tuberculous condition. Fair recuperative power.	
21	Mr. H.	30	9	9	82	0	....	Advanced pulmonary tuberculosis. Abundant sputum. Bacilli.	Marked tuberculous condition. Slight recuperative power.	Dr. H. H. Bucknum.
22	Mr. F.	22	5	6	89	0	....	Last stage of pulmonary tuberculosis. Died two days after taking blood specimen.	Marked tuberculous condition. No recup'tive power. Granules slightly basophile	Dr. S. G. Bonney.
23	Mr. E.	21	6	12	81	½	½	Advanced pulmonary tuberculosis. Abundant sputum. Bacilli. Died one month later.	Marked tuberculous condition. No recuperative power.	Dr. C. B. Lyman.
24	Miss C.	16	9	17	73	0	1	Tuberculous meningitis. Died soon after taking blood films.	Marked tuberculous condition No recuperative power. No eosinophile cells. Granules slightly basophile. Myelocytes.	Dr. E. P. Hershey. Dr. J. T. Eskridge.
25	Mr. B.	58	9	11	80	½	....	Advanced pulmonary tuberculosis. Purulent sputum. Bacilli.	Marked tuberculous condition Granules slightly basophile	
26	Mr. S.	..	35	11	52	2	....	Tuberculous periostitis. Amputation. Recovery.	Slight tuberculous condition. Strong recuperative power. Five w'ks after amputation	Dr. L. E. Lemen.

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PERCENTAGES OF VARIATION FROM NORMAL CONDITIONS.—Concluded.

No.	Name.	Age.	Percentage of Small Lymphocytes.	Percentage of Large Lymphocytes.	Percentage of Phagocytes or "Neutrophiles."	Percentage of Eosinophile Leucocytes.	Percentage of Myelocytes.	Condition Ascertained from a Study of the Patient.	Condition Ascertained from a Study of the Blood.	Attending Physician.
27	Mr. R.	16	7	12	80	½	½	Tuberculous abscess of spine, with necrosis of vertebra Constant suppuration.	Marked tuberculous condition. Slight recuperative power.	Dr. W. W. Grant.
28	Mr. H.	..	23	15	60	2	....	Tuberculous hip-joint disease. Improvement slow.	Marked tuberculous condition. Slight recuperative power.	Dr S. D. Van Meter.
29	Mr. —	58	21	11	59	9	....	Tuberculous knee-joint. No suppuration.	Tuberculous condition moderately marked. Bone probably involved.	Dr. John Boice.
30	Miss M.	22	9	13	77	0	1	Tuberculous adenitis of cervical glands, severe form.	Tuberculous condition well marked. Feeble recuperative power.	Dr. Chas. Denison.
31	Mr. X.	25	25	13	57	5	....	Strong tuberculous history. Subject in perfect health.	Tuberculous condition slightly marked. Very strong recuperative power.	Dr. C. B. Lyman.
32	Mrs. X.	28	22	11	65	2⅔	⅓	Strong tuberculous history. Marked tuberculous predisposition.	Marked tuberculous condition. Strong recuperative power.	Dr. W. W. Grant.
33	Mr. S.	53	8	21	70	1	....	Tumor in left side Diagnosis not made.	Tuberculous condition. Strong recuperative power.	Dr. Chas. Denison.
34	Mr. H.	41	12	13	74	1½	....	Strong tuberculous predisposition. Not yet broken down.	Tuberculous condition marked. Strong tendency to recover.	
35	Miss L.	24	21	6	70	3	....	Malarious anaemia. No tuberculous history.	Tuberculous condition *not* present.	Dr. E. R. Axtell.

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The thirty-five cases represent, as nearly as possible, every stage in the tuberculous condition, including those who have inherited a strong predisposition, those in various stages of the active disease, and those in various degrees of convalescence.

I am indebted to many of the physicians of Denver for numerous cases furnished from their private practice. And I wish here to express my gratitude for their valuable aid in this laborious study.

Case 1—Patient referred to me by Dr. Axtell. Examination of blood was made without any knowledge of the history or physical condition of the patient.

Blood examination revealed the following: Very low percentage of small lymphocytes; very high percentage of large lymphocytes; many giant lymphocytes with irregular contour and protruding globules of hyaloplasm; many varieties of lymphocytes; many cells of all varieties undergoing disintegration; faintly stained nuclei; marked difference in the staining qualities of lymphocytes, both small and large—some staining faintly, others very deeply. Granules of most phagocytes well stained. A few finely granular eosinophile lymphocytes, or myelocytes; red cells apparently normal; many groups of debris from disintegrating leucocytes. From the above examination I reported a marked tubercular condition.

I then received the following history from Dr. Axtell: Mr. H., age 18; been in Colorado ten years. Gives a fairly good family history. Father has always had asthma; one aunt died of tuberculosis. Personal history: Enjoyed good health until one year ago. He then noticed that he was coughing, and that he was not up to his usual realth. In December, 1895, the cough became worse, and he began to lose rapidly in weight and strength. Examination April 6, 1896, showed a dullness over the base of left lung; a few rales at left apex; very little sputum; bacilli present. The blood examination was made one month after the above physical examination.

Case 2—Miss X., age 23; born in Illinois; patient of Dr. Waxham. Family history: Mother died of tuberculosis. Personal history: Present trouble began about two years ago; has

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had several hemorrhages; only one since coming to Colorado; been a resident of Colorado for one year and a half; cough troublesome; very little expectoration; voice husky; no night sweats; chest expansion two inches; no sputum examination made. Diagnosis: Tuberculous infiltration in upper lobes of both lungs.

Blood examination revealed the following: Moderate decrease in percentage of small lymphocytes; marked increase in percentage of large lymphocytes; numerous giant lymphocytes, with irregular contour and protruding globules of hyaloplasm; a slight increase in percentage of phagocytes, but not marked; phagocytes fairly uniform in size and appearance; about 5 per cent. small lymphocytes, 30 per cent. large lymphocytes, and 5 per cent. phagocytes show evidence of disintegration; numerous small groups of debris from degenerate cells; eosinophile cells beautifully stained and rich in granules; nuclei well stained; red cells normal.

Case 3—Patient referred to me by Dr. Axtell. Blood examination made without any knowledge of history or physical condition of patient.

Blood examination revealed the following: Moderate decrease in percentage of small lymphocytes; slight increase in percentage of large lymphocytes; a few giant lymphocytes, and almost all undergoing disintegration; slight increase in percentage of phagocytes; comparatively few leucocytes undergoing disintegration; a few of all varieties of leucocytes with almost transparent nuclei; most phagocytes with nuclei and granules well stained; a few phagocytes with scarcely a granule visible, cell contour indistinct, and nuclei faintly stained; numerous groups of debris from disintegrating cells; eosinophile cells normal; red cells normal. From the above examination, I reported the following to Dr. Axtell: "Tuberculous condition fairly well marked, with strong tendency to recover."

I then received the following history: Mr. H., age 26; been in Colorado eighteen years. Mother died of tuberculosis. Personal history: Patient enjoyed good health until 1888, when he developed a slight cough, and later had a slight hemorrhage. From this cough he entirely recovered, and was well

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and strong until September, 1894, when cough returned. The sputa was examined a number of times, but with negative results, until February, 1896. He now has a small localized tuberculous lesion at right apex, but has no fever; no constitutional disturbance of any kind.

Case 4—Miss S., age —; born in New York city. Patient of Dr. H. W. McLauthlin. Family history negative. Personal history: She suffered from malaria for two years—1886-1887. Her brother, a physician, wrote Dr. McLauthlin the following account of her present illness: "During last fall (1895) she had two attacks of bronchitis following very closely one upon the other. In the early part of January she was taken with pleurisy of the left side, the effusion extending to the sixth rib. It took its usual course, the effusion subsiding in about ten days. There was a little pain, which I attributed to adhesions, but the cough continued longer than usual in an uncomplicated case of pleurisy." Although a consultation of physicians resulted in excluding phthisis, a change of climate was advised, and she came to Colorado. She consulted Dr. McLauthlin, March 22, 1896. Pulse, 90; temperature, 99 1-2. Considerable cough; dullness on percussion, and a few moist rales on left side. A sample of sputum was examined by Dr. H. C. Crouch, who found bacilli in limited numbers. Six weeks later she had gained a few pounds in weight, and there were fewer moist rales.

On June 16, the patient was referred to me by Dr. McLauthlin for an examination of the blood, which revealed the following: A marked decrease in percentage of small lymphocytes; a slight increase in percentage of large lymphocytes; giant lymphocytes with protruding globules of hyaloplasm; large quantity of debris from disintegrating leucocytes scattered throughout the specimen; large lymphocytes having undergone complete disintegration; numerous phagocytes with transparent nuclei; phagocytes of very irregular size—some very small and others very large; granules of phagocytes fairly well stained; about 10 per cent. of the phagocytes and 30 per cent. of large lymphocytes undergoing disintegration; red corpuscles normal; rouleaux-forming power good; no poikilocytosis.

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Case 5—Miss N., age 38; born in Illinois; been in Colorado nine years. Patient consulted me to ascertain the condition of her blood, especially with reference to tuberculosis. She began to relate her history, but I asked her to delay until I had made the examination.

The blood examination revealed the following: Marked decrease in percentage of small lymphocytes; considerable increase in percentage of large lymphocytes; a few giant lymphocytes with irregular contour and protruding globules of hyaloplasm; slight increase in the percentage of phagocytes; a few small and large lymphocytes with narrow transparent ring separating nucleus from cell body; numerous large lymphocytes undergoing disintegration; very few small lymphocytes and phagocytes undergoing disintegration; almost all phagocytes in a good condition, nuclei and granules well stained; eosinophile cells normal; red cells almost normal. I reported: Blood indicates a tuberculous condition fairly well marked; disintegration small; majority of the cells in a normal condition; nature making a fairly strong effort to counteract the tuberculous condition.

Patient then gave the following history: Family history: Grandmother, an aunt, two uncles, and one cousin on mother's side died of tuberculosis. Personal history: Patient has never been strong. At 19 she had bronchitis, which continued for four years. Cough and expectoration came on later, and she was advised to come to Colorado. On arriving in Denver, had her lungs examined, and found the apex of right lung affected. Five years after coming to Colorado, was much better and succeeded in passing a favorable examination for life insurance. Two years after getting insurance she broke down with "nervous prostration," but lungs were not involved. During the past winter had renewed attacks of bronchitis, some cough and expectoration. These attacks recurred again in May. Since she has been in Colorado, she has had two slight hemorrhages. At time of examining the blood patient was feeling quite well.

Case 6—Mr. B., age 58; been in Colorado many years. Family history: One sister died of quick consumption at 20; otherwise family history good. Personal history: Patient has

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always had fair health. For two or three years, however, he has had sudden and severe pains in right side, but not on inspiration. These did not last long, and he gave them very little consideration. Before the present sickness, had been feeling unusually well. Present trouble began suddenly; extreme weakness, slight fever for a few days, then returned to normal; slight cough, no pain. In bed two weeks, returned to office in three weeks. During this time no lung symptoms could be detected. Remained at work only four days, and was obliged to give up; felt weak, tired, and could not work. Cough then began to become quite troublesome; very little expectoration; profuse night sweats; no appetite. Blood examination made, and revealed all of the characteristics of tuberculosis. Another examination of lungs was then made. Left lung was normal, but middle and lower part of right lung greatly involved; dullness on percussion, and numerous rales.

Blood examination revealed the following: Very low percentage of small lymphocytes; great increase in percentage of large lymphocytes; numerous giant lymphocytes; many small and large lympocytes undergoing disintegration; about normal percentage of phagocytes and eosinophile cells; many cells with imperfectly or poorly stained nuclei; granules of many phagocytes few in number and poorly stained; many phagocytes with evidence of disintegration; few large groups of debris from disintegrating cells; majority of eosinophile cells normal with abundant granules; a few very small eosinophile cells with a single nucleus attempting to divide; red cells apparently normal. On advice, patient ceased all work and went to the mountains. At end of two weeks had gained considerably. All symptoms had improved. Another blood examination was made, and great improvement was observed.

Case 7—Mr. C., age 27, single; born in Boston. Patient of Dr. Bonney. Family history: Maternal aunt died of tuberculosis; otherwise family history good. Personal history: In May, 1895, contracted a severe cold; prostrated for six weeks; attended with cough; recurred in September. Average previous weight, 150. Loss of weight and strength in fall of 1895; continued at work during fall and winter of 1895; morning cough; slight expectoration. Arrived in Colorado, April, 1896;

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weight on arrival, 127: Tuberculous infection of right chest, from apex to fourth rib; active tuberculous process at left apex to second rib.

Blood examination revealed the following: Considerable decrease in percentage of small lymphocytes; slight increase in percentage of large lymphocytes; moderate increase in phagocytes; very few giant lymphocytes; very little cell disintegration; very little debris from disintegrating leucocytes; eosinophile cells abundant and in a healthy condition; nuclei and granules of phagocytes fairly well stained; slight disintegration noticed in large lymphocytes and phagocytes; red cells normal.

Case 8—Mr. J., age 25, single, colored. Patient of Dr. Waxham. Family history: Sister died of acute quick consumption. Patient has been in Colorado seven months; improved since coming; gained thirteen pounds. Diagnosis: Extensive tuberculous ulceration of larynx; bacilli present in large number.

Blood examination revealed the following: About 50 per cent. decrease in small lymphocytes; 100 per cent. increase in large lymphocytes, and 15 per cent. increase in phagocytes; few giant lymphocytes; few of all varieties undergoing disintegration; much debris from degenerate cells; nuclei and granules of phagocytes generally well stained; a few disintegrating eosinophile cells; red cells normal.

Case 9—Mr. M., age 56, married; born in Germany; in Denver five months. Patient of Dr. Henry Sewell. Family history negative. Personal history: Has had chills and fever, typhoid, asthma, and bronchitis. Present trouble began eight months ago, after getting his feet wet, when he lost his voice. Has had more or less cough for seven or eight months. He now expectorates slightly. Bacilli have been found in sputum. Some time ago had a hemorrhage. Physical examination: Laryngeal examination by Dr. Black, and found tuberculous laryngitis. Dullness at apex of right lung; a few rales over both lungs.

Blood examination revealed the following: Moderate decrease in percentage of small lymphocytes; marked increase in percentage of large lymphocytes; numerous giant lymphocytes

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with irregular contour and protruding globules of hyaloplasm; very little increase in percentage of phagocytes; many cells of all varieties undergoing disintegration; many faintly stained nuclei; many phagocytes with nuclei and granules faintly stained; marked variation in appearance of phagocytes—some with a single irregular nucleus, and others with five distinct nuclei; numerous groups of debris from disintegrating cells; red cells almost normal.

Case 10—Mrs. F., age 25; lives in Kansas. Family history: Grandmother, and three aunts, grandfather, a maternal uncle, and aunt died of tuberculosis. Personal history: From 14 to 16 she was troubled with severe cough, fever and delayed menses. When menses appeared, cough ceased. Was then better for a number of years. Cough then reappeared, with fever and pain in lungs; had two hemorrhages. Has been troubled more or less until the present. Now has slight cough, but no expectoration. Has lost weight and strength.

Blood examination revealed the following: Percentage of small lymphocytes normal; percentage of large lymphocytes greatly increased; many giant lymphocytes with protruding globules of hyaloplasm; decrease in percentage of phagocytes; many small lymphocytes with almost transparent nuclei; a few phagocytes with transparent nuclei; great many large lymphocytes undergoing disintegration; a few phagocytes completely disintegrating, and others partially; majority of phagocytes in a normal condition; eosinophile cells slightly increased in number, and rich in beautiful granules; many red cells diminished in haemoglobin, otherwise in a normal condition.

Case 11—Mr. U., age 32, single; born in New York. Family history: Mother died of tuberculosis when patient was seven years old. Father living. The remaining family history good. Personal history: Eight years ago patient had pleurisy. Some time later, after violent exercise, had a hemorrhage; recovered. Four years later had a relapse from overwork, followed by cough and profuse expectoration; bacilli in sputum. Came to Colorado, and in one year cough and expectoration ceased. During the past three years has steadily improved. A few moist rales continue in left lung. Patient apparently in good physical condition.

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Blood examination revealed the following: Percentage of small lymphocytes almost normal; percentage of large lymphocytes doubled; numerous giant lymphocytes with irregular contour and protruding globules of hyaloplasm; numerous small and large lymphocytes with a narrow transparent ring separating the nucleus from the cell body; lymphocytes with almost transparent nuclei; a few phagocytes with faintly stained nuclei, and granules few in number and scattering; the majority of phagocytes uniform in size and appearance, nuclei and granules distinctly stained; most of the eosinophile cells are normal—but a few undergoing disintegration; red cells apparently normal.

Case 12—Mr. M., age 32, unmarried; born in New York. Patient of Dr. Bonney. Family history good. Previous history excellent. Date of commencement of present trouble, April, 1895. Began with slight cold, with expectoration; slight hemorrhage in June; slight recurrence in August; quit work in December; arrived in Colorado, December 12. Previous weight, 170; weight on arrival in Denver, 156. Physical examination at time of arrival in Denver: Tuberculous infection at right apex to the second space; sputa moderate; bacilli present. At time of the examination of the blood, patient much improved.

Blood examination revealed the following: Slight increase in the percentage of small lymphocytes; no increase in the percentage of large lymphocytes; very few giant lymphocytes, and only a few of these showing signs of disintegration; about normal number of phagocytes; nuclei and granules of most phagocytes well stained; a few small lymphocytes, and also phagocytes, with nuclei almost transparent; only a few of each variety of leucocytes showing evidence of disintegration; a few scattering groups of debris from disintegrating cells; red cells apparently normal.

Case 13—Mr. X. Patient of Dr. Henry Sewell. Family history not secured. Personal history: Patient came to Colorado a number of years ago with tuberculosis; now has no visible evidence of the disease.

Blood examination revealed the following: Great increase in percentage of small lymphocytes; percentage of large lymphocytes normal; very few giant lymphocytes with irregular con-

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tour and protruding globules of hyaloplasm; slight decrease in percentage of phagocytes; phagocytes and eosinophile cells in a normal condition; very little cell disintegration observed; granules and nuclei well and uniformly stained; scarcely any debris from disintegrating cells observed; red cells normal.

Case 14—This case, a patient of Dr. Denison, was carefully studied at intervals during two months while under tuberculin treatment. Almost all, if not all, of the morphological appearances characteristic of tuberculosis were present; but each examination of the blood revealed an improvement. The case is fully reported by Dr. Denison in his paper before this society. The table which I prepared of this case will show a steady approach of the percentages of the various types of leucocytes to the normal. An interesting observation in this connection is, that as the blood approaches the normal, the patient also improves, demonstrating beautifully that the condition of the individual can be interpreted from the appearances of the leucocytes—if we correctly interpret their significance.

Case 15—Mr. E., age 23, single; born in Illinois. Patient of Dr. Chas. Denison. Family history: Grandfather on father's side died of tuberculosis at 44. Personal history: Pain in chest two years ago. Last February had grippe; pain under left shoulder blade. Afterwards had chills and fever; gave up work in April; in house six weeks, and confined to bed part of the time; lost weight and appetite; expectoration began six weeks ago; became profuse three weeks ago, and continues; been in Colorado one week. Physical examination: Pulse, 110; respiration, 20; temperature, 101 1-2 degrees; spirometrical record, 145 cubic inches; manometer record, 70 m. m.; bacilli abundant in sputum. Diagnosis: Cavity in left lung, with dullness and deficient action around it—third stage; dullness in apex of right lung—first stage.

Blood examination revealed the following: Great decrease in the number of small lymphocytes; 20 per cent. of these undergoing degeneration; slight or no increase in the large lymphocytes; 12 per cent. of these undergoing degeneration; a large increase in the number of phagocytes—81 per cent.; more than 9 per cent. of these undergoing disintegration; slight increase in

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number of eosinophiles; all nuclei characteristic on account of their faint reaction to stains; the granules of the phagocytes scarce, often scattering, and indistinct; a number of eosinophiles undergoing disintegration—granules few in number and often scattering; very little change in the red corpuscles.

Case 16—Mr. M., age 32, single; born in Kentucky. Patient of Dr. Grant. Family history: One brother died of tuberculosis at 25—sick eighteen months; paternal uncle at 21, maternal uncle at 35, and two cousins each at 30. A third cousin now has tuberculosis. Mother, two brothers and one sister living and well. Personal history: present trouble began in March, 1891; had hemorrhage after excessive office work; no premonitory symptoms. Five weeks later came to Colorado; gained twenty-three pounds in three months; then returned to Kentucky for one month, and became worse. Again returned to Colorado; cough and expectoration have been increasing—now about four ounces a day; weight when well, 150; now 120. Diagnosis: Advanced pulmonary tuberculosis; large cavity in right lung.

Blood examination revealed the following: Extreme decrease in percentage of small lymphocytes; no increase in percentage of large lymphocytes; great increase in percentage of phagocytes; numerous giant lymphocytes with irregular contour and protruding globules of hyaloplasm; about 10 per cent. of small lymphocytes, 25 per cent. large lymphocytes, 10 per cent. phagocytes, and 33 per cent. of eosinophile cells show evidence of disintegration; numerous small and large groups of debris from disintegrating leucocytes; a few phagocytes with scarcely any granules visible; many phagocytes with granules deeply stained—almost a basophile tint; irregular size of phagocytes—some very small and others very large; a few giant phagocytes—one observed with seven nuclei, lobulated and transitional in variety; many phagocytes with five distinct nuclei; very little disintegration noticed in the red cells.

Case 17—Mr. H., age 55, married; born in Massachusetts; sixteen years in Colorado. Patient of Dr. I. B. Perkins. Family history: Mother, three brothers, and one paternal uncle died of tuberculosis. Personal history: Lungs began to trouble him twenty-six years ago; took cold readily. Came to

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Colorado sixteen years ago on account of lungs. Had grippe five years ago, when lung trouble recurred with greater energy, and has progressed ever since. Began aseptolin treatment three months ago. Up to that time cough and profuse expectoration, but since then both have diminished; bacilli in sputum.

Blood examination revealed the following: Great decrease in percentage of small lymphocytes; great increase in percentage of large lymphocytes; a few giant lymphocytes undergoing disintegration; moderate increase in percentage of phagocytes; many eosinophile cells; numerous cells of all varieties show evidence of disintegration; many faintly stained nuclei; granules of phagocytes poorly stained and indistinct, often blended together; red cells almost normal.

Case 18—Mr. X., age 38; born in Illinois; married. Patient of Dr. Crouch. Family history negative. Personal history: Absolute health until he broke down in 1886. Began with cough and gradual loss of weight and strength, followed by pneumonia; bacilli in sputum at that time. In fall of 1886 had a slight hemorrhage. During the past ten years there have been numerous recurrences of lung complication, with rise of fever, followed by an effort to recuperate. Cough and expectoration have been constant. At present there are scattering foci in upper lobe of each lung. Weight when well, 145; present weight, 118. At the time of taking the blood specimen patient had a slight recurrence of lung trouble, with fever, increased cough, and expectoration.

Blood examination revealed the following: Very low percentage of small lymphocytes; slight increase in percentage of large lymphocytes; numerous giant lymphocytes with irregular contour and protruding globules of hyaloplasm; great increase in percentage of phagocytes; 10 per cent. small lymphocytes, 30 per cent. large lymphocytes, and 15 per cent. phagocytes show evidence of disintegration; many phagocytes scarce in granules, granules poorly stained and scattering; many phagocytes with nuclei faintly stained; many lyhphocytes with nar row transparent ring separating nucleus from cell body; numerous groups of debris from disintegrating leucocytes; eosinophile cells appear to be normal, except that the granules are few in number.

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Case 19—Mr. C., age 28, married; born in New York. Family history shows strong hereditary tendency to tuberculosis. Personal history: Present trouble began about one year ago, after taking a severe cold; continued to get worse; cough and expectoration increased; lost weight and strength. Been in Colorado six months; cough continues, and expectoration profuse; bacilli abundant; extensive lung cavity.

Blood examination revealed the following: Very low percentage of small lymphocytes; a slight increase in percentage of large lymphocytes; a few giant lymphocytes with protruding globules of hyaloplasm; many degenerate phagocytes with disintegrated and unevenly stained nuclei, granules poorly stained and scattering; other phagocytes undergoing disintegration, with shreds of spongioplasm protruding, a cavity in the cell showing a loss of substance; numerous large groups of debris from disintegrating leucocytes; about 1 per cent. of leucocytes are finely granlar eosinophile lymphocytes, or myelocytes; a large percentage of phagocytes have nuclei well stained, granules abundant and distinctly stained, showing recuperative power.

Case 20—Very similar to case 19. Mr. L., a young man from New York, with advanced pulmonary tuberculosis; a greater number of eosinophile cells, and somewhat less cell disintegration.

Case 21—Mr. H., age 30, married; born in New York. Patient of Dr. Bucknum. Family history negative. Personal history: In 1890 had grippe. In 1892 had anal fistula. In 1893 had typhoid fever. In 1894, chills and general breaking down. Has had cough since 1894. Present condition: Left lung very little affected. The entire right lung was affected —moist rales detected over all parts; cough and profuse expectoration; bacilli present in sputum. Patient has been under aseptolin treatment for two months. Cough and expectoration have diminished considerably; appetite better.

Blood examination revealed the following: Great decrease in percentage of small lymphocytes; slight increase in percentage of large lymphocytes; many giant lymphocytes with irregular contour and protruding globules of hyaloplasm; considerable increase in percentage of phagocytes; total ab-

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sence of eosinophile cells; numerous leucocytes of all varieties show evidence of disintegration; large and small groups of debris from disintegrating cells; the majority of phagocytes show nuclei and granules well stained.

Case 22—Mr. T., age 22; born in England; unmarried. Patient of Dr. Bonney. Family history good. Personal history: In October, 1895, arrived in New York from Paris, where he had lived for two years. Had slight cough and expectoration; both increased during the fall and winter of 1895; lost weight and strength rapidly; dyspnoea on slight exercise. Arrived in Colorado in March, 1896. Weight last November, 140; weight on arriving in Denver, 126. Considerable cough, and about two ounces of expectoration in twenty-four hours; sputum thick and purulent; left lung extensively involved. At the time of the examination of the blood (June 9, 1896) the tuberculous process had extended throughout the entire chest—the right lung as well as the left showing evidence of unusually active infection.

Blood examination revealed the following: Extremely low percentage of small lymphocytes; no increase in percentage of large lymphocytes; very high percentage of phagocytes; total absence of eosinophile cells; almost all of the large lymphocytes are giant cells with irregular contour, and show evidence of disintegration. The greatest evidence of disintegration is to be found in the granules of the phagocytes; granules few in number, faintly stained, slightly basophile or faintly oxyphile, and scattering. Very little debris noticed in the specimen.

Note—Dr. Bonney informed me that the patient died three days after the examination of the blood.

Case 23—Mr. E., age 21, single; born in Denver. Patient of Dr. Lyman. Father and mother living and in good health; only child; uncles and aunts living. Personal history: Never had any sickness until seven months ago, at which time he took "a slight cold," for which he did nothing. At that time he weighed 120 pounds; at present, 100 pounds. For six months had some cough without expectoration. Three months ago expectoration began; bacilli present. Digestive organs in

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fairly good condition. Sleeps well; no night sweats. Examination of chest showed dullness over upper portion of right lung.

Blood examination revealed the following: Very low percentage of small lymphocytes; marked increase in percentagee of large lymphocytes; large increase in percentage of phagocytes; many leucocytes of all varieties undergoing disintegration; small and large lymphocytes with almost transparent nuclei; numerous giant lymphocytes with protruding globules of hyaloplasm; irregular size of phagocytes—very large and very small; many phagocytes undergoing disintegration—faintly stained nuclei, granules scarce, indistinctly stained, and scattering; numerous groups of debris of disintegrating cells; a few finely granular eosinophile lymphocytes; eosinophile cells very scarce, only one being found in an hour's study, and it was undergoing disintegration; granules few in number and scattering.

Note—Dr. Lyman has reported that the patient died June 23, one month after the above examination.

Case 24—Miss C., age 16; born in Colorado. Patient of Dr. Hershey. Family history: Father had tuberculosis twenty years ago; came to Colorado and got well. Remaining family history negative. Personal history: Trouble began one year ago, with headache, which persisted. Consultation with Dr. Eskridge resulted in a diagnosis of "tuberculous meningitis." Patient died June 18, 1896. Blood films taken just before death.

Blood examination revealed the following: Marked decrease in percentage of small lymphocytes; marked increase in percentage of large lymphocytes; numerous giant lymphocytes —all with irregular contour and protruding globules of hyaloplasm; slight increase in percentage of phagocytes; absence of eosinophile cells; a few finely granular eosinophile lymphocytes, or myelocytes; a large number of each variety of leucocytes undergoing disintegration—all degrees, from partial to complete; a large quantity of debris from disintegrating cells; irregular size of phagocytes—some as small as small lymphocytes; phagocytes almost destitute of granules—the granules that are present stain very faintly, many with *a basophile tint;*

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a few leucocytes of all varieties with almost transparent nuclei, but the majority have deeply stained nuclei; numerous small and large lymphocytes with a distinct sharp ring separating nucleus from cell body; many phagocytes grouping together—a characteristic which I have frequently observed in blood when the patient is rapidly approaching death.

Case 25—Mr. B., age 58, married. Family history good. Personal history: Never sick but once in his life—seventeen years ago had inflammatory rheumatism. Present trouble began four month ago; was in perfect health; lived in Virginia; worked in rain; remained for hours in damp clothing; became over-heated and cooled suddenly; took severe cold; chill and fever followed; cough and expectoration; lost weight and strength rapidly; appetite failed; night sweats. Came to Denver completely prostrated; both lungs badly affected; cavities, and very thick heavy sputum; temperature, 101 degrees; respiration, 30; pulse, 120.

Blood examination revealed the following: Great decrease in percentage of small lymphocytes, with 15 per cent. undergoing disintegration; marked increase in percentage of large lymphocytes, with 45 per cent. undergoing disintegration; a large increase in percentage of phagocytes, with many undergoing disintegration; granules few in number and very poorly stained—many have scarcely any granules perceptible; a large number of giant lymphocytes with protruding globules of hyaloplasm; a large quantity of debris from degenerate cells; marked disintegration of leucocytes, and especially the granules of phagocytes, and the breaking up of lymphocytes; nuclei of most phagocytes well stained—a few have transparent nuclei; no disintegration of red cells.

Case 26—Mr. S., age 25. Patient of Dr. L. E. Lemen. Family history negative. Personal history: Four months ago trouble began in his left leg. It advanced until amputation was necessary, which was made six weeks ago. Diagnosis: Tuberculous periostitis. Patient recovered rapidly. Blood examination made five weeks after amputation.

Blood examination revealed the following: A marked increase in percentage of small lymphocytes; increase in percentage of large lymphocytes; numerous giant lymphocytes with

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irregular contour and protruding globules of hyaloplasm; many varieties of lymphocytes; a small percentage of each variety undergoing disintegration; a slight decrease in percentage of phagocytes; a few phagocytes with almost transparent nuclei; only a small per cent. of phagocytes undergoing disintegration; most of the phagocytes in a normal condition; eosinophile cells numerous and normal; numerous groups of debris from disintegrating cells uniformly present in the specimen; red cells normal.

Case 27—R., male, age 16. Patient of Dr. Grant. Family history: Father, mother, one brother and sister have died of tuberculosis. Personal history: Patient has tuberculosis of spinal vertebra; abscess formed which broke spontaneously in right groin. One year later patient was brought to St. Joseph's Hospital, and laminectomy performed by Dr. Grant. Swelling over fourth lumbar vertebra; spinous process diseased; abscess communicated with the sinus under right Poupart's ligament. Boy improved and is going about; general health fair, but sinus still discharging. Diagnosis: Tuberculous necrosis of spinal vertebra.

Blood examination, made one year after the operation, revealed the following: Percentage of small lymphocytes greatly diminished; marked increase in percentage of large lymphocytes and phagocytes; numerous giant lymphocytes with protruding globules of hyaloplasm; a few finely granular eosinophile lymphocytes, both small and large; partial and complete disintegration observed in all varieties of leucocytes; considerable debris from disintegrating cells scattered throughout the specimen.

Case 28—Mr. H., age 37; born in Sweden; in United States twelve years; in Colorado eight months. Patient of Dr. S. D. Van Meter. Family history excellent. Personal history: Severe pain suddenly appeared in left hip, sixteen years ago, while he was doing heavy lifting. A large, hard swelling resulted. Under local treatment this subsided. Four years ago had typhoid fever; during convalescence pain reappeared in left hip, and hip-joint disease slowly developed. Was in Cincinnati City Hospital for two and one-half years, and during that time the head of the femur was removed. Came to Den-

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ver in 1895; admitted into St. Anthony's Hospital in February, 1896. Hip then much swollen and inflamed, pus discharging through numerous fistulae. Patient extremely emaciated. Under treatment there has been steady and continuous improvement.

Blood examination four months later revealed the following: Percentage of small lymphocytes almost normal; marked increase in percentage of large lymphocytes; a few giant lymphocytes; almost normal percentage of phagocytes and eosinophile cells; numerous cells of all varieties show evidence of disintegration; many phagocytes with faintly stained nuclei, and granules few in number, poorly stained and scattering; red cells show evidence of disintegration—diminished haemoglobin, and slight poikilocytosis.

Case 29—Mr. B. Patient of Dr. John Boice. History not secured. Diagnosis: Tuberculosis of knee joint; advanced stage; no discharge of pus.

Blood examination revealed the following: Percentage of small lymphocytes very slightly diminished; marked increase in percentage of large lymphocytes; slight decrease in percentage of phagocytes; a great increase in percentage of eosinophile cells; a few giant lymphocytes; few of all varieties of cells showing evidence of disintegration; numerous small and large groups of debris from disintegrating cells. The characteristic of this case is the great increase in the percentage of eosinophile cells, which strongly points to involvement of bone.

Case 30—Miss M., age 22. Patient of Dr. Denison. Severe tuberculous adenitis; glands removed by Dr. C. A. Powers. This case is also fully reported in Dr. Denison's paper before this society. The blood examinations, which extended over nearly two months, corresponded to the condition of the patient very accurately. It first indicated a profound tuberculous condition, followed by improvement, and again by a relapse.

Case 31—Mr. X., age 25, single; born in New York; came to Colorado eight years ago. Referred to me by Dr. C. B. Lyman, on account of the unusual tuberculous history. Family history: Father died of phthisis at 57, when subject was 14; mother died of phthisis at 48, when subject was 16; three sis-

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ters died of phthisis, ages 29, 29, and 19; two brothers died of phthisis, ages 19 and 26; one brother living, age 26, married, and in good health; a paternal uncle died of phthisis at age of 30; maternal grandmother died of phthisis, age unknown. Personal history: Has never been sick, and is now enjoying excellent health.

Blood examination revealed the following: Percentage of small lymphocytes almost normal; a marked increase in the percentage of large lymphocytes; very few giant lymphocytes —almost all undergoing disintegration; slight decrease in percentage of phagocytes; quite an increase in percentage of eosinophile cells; a very small percentage of each variety showing signs of disintegration; small and large groups of debris from disintegrating leucocytes, uniformly scattered throughout the specimen; very few transparent nuclei; nuclei of phagocytes stained better than the granules; variation in size of phagocytes—very small and very large; a large variety of lymphocytes; a few small and large lymphocytes with narrow transparent ring between nucleus and cell body; red cells normal.

Case 32—Patient referred to me by Dr. Grant. Examination of the blood made without any knowledge of the history or physical condition of patient.

Blood examination revealed the following: Very little decrease in percentage of small lymphocytes; slight increase in percentage of large lymphocytes; a large number of giant lymphocytes with protruding globules of hyaloplasm, and marked evidence of disintegration; a large number of small lymphocytes with lightly stained nuclei; many large lymphocytes with almost transparent nuclei; a few phagocytes with poorly stained nuclei; a narrow, transparent ring between the nucleus and cell body in many small and large lymphocytes; a few scattering groups of debris from disintegrating leucocytes; a few large lymphocytes with fine eosinophile granules—myelocytes; most phagocytes with nuclei and granules well stained, and in a normal condition; eosinophile cells slightly increased in number, and in a normal condition; 15 per cent. of small lymphocytes, 25 per cent. of large lymphocytes, and 5 per cent. of phagocytes show evidence of disintegration. From the above conditions, I reported that the blood indicated a marked

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tuberculous condition, with a strong effort on the part of nature to overcome the same.

I then received the following history: Mrs. X., age 28, married. Father, paternal grandmother, three sisters, and two brothers have died of pulmonary tuberculosis. Personal history: Patient has never had any evidence of organic disease, but is wanting in physical strength and endurance. Dr. Grant believes that pulmonary tuberculosis would undoubtedly develop in this case if living under unfavorable climatic conditions.

Case 33—Mr. S., age 53, married. Patient furnished by Dr. Denison, with instructions to ascertain if there was any tuberculous condition shown from the condition of the blood. The patient was an entire stranger, and no questions were asked.

The blood examination revealed the following conditions: Very low percentage of small lymphocytes; marked increase in percentage of large lymphocytes; a few giant lymphocytes; many degenerate cells of all varieties; small and large groups of debris from disintegrating leucocytes; a few small lymphocytes with nuclei almost transparent; a few phagocytes with very light nuclei; nuclei of eosinophile cells almost transparent; a great number of phagocytes in a good condition—nuclei and granules well stained; red cells in a normal condition. From the above conditions, I returned the following written diagnosis: "The blood indicates a tuberculous condition, with a strong effort to overcome same."

I was then informed by Dr. Denison that a positive diagnosis had not been made, but that the patient had a tumor in the left side, supposed to be hydronephrosis, or enlargement of the spleen; also, that he had bronchitis; no bacilli found. From the fact that he gave no decided tuberculous history, and that his present appearance indicated fair health, the diagnosis of tuberculosis had scarcely been entertained. Upon the strength of the above diagnosis, Dr. Denison decided to test the patient with tuberculin to ascertain if he would react, and thereby confirm or disprove it. A marked reaction followed the tuberculin test, which confirms the above diagnosis. Under repeated injections the patient is reported improving. A

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more extensive report of this case is given in Dr. Denison's paper before this society.

Case 34—Mr. H., age 41, married; born in Ohio; lived in Illinois eleven years; has just arrived in Colorado, on account of bad health. Family history: Two uncles, and one cousin on father's side died of tuberculosis. Personal history: Enjoyed good health until two years ago. Takes cold readily; took a severe cold, followed with cough, expectoration, and soreness in chest; became better. During September, 1895, had "typho-malaria," accompanied by troublesome cough, very little expectoration, chest extremely sore, and profuse night sweats. Finally recovered and pursued work during the winter. In May, 1896, cough again became very troublesome, with profuse expectoration at times. Lost weight and strength. Advised to come to Colorado. Had been in Denver only a few weeks when I was consulted for a diagnosis.

Blood examination revealed the following: Marked decrease in percentage of small lymphocytes; increase in percentage of large lymphocytes; numerous giant lymphocytes with irregular contour and protruding globules of hyaloplasm; increase in percentage of phagocytes; numerous lymphocytes with lightly stained nuclei, and a narrow, transparent ring separating the nucleus from the cell body; 12 per cent. small lymphocytes, 28 per cent. large lymphocytes, 11 per cent. phagocytes, and 33 per cent. eosinophile cells show evidence of disintegration; numerous groups of debris from disintegrating cells; most of the phagocytes have nuclei and granules well stained; red cells normal.

Case 35—Patient of Dr. E. R. Axtell. Patient was furnished without giving any history of the case. I was requested to examine the blood and ascertain if the tuberculous condition was present.

Blood examination revealed the following: Very little decrease in percentage of small lymphocytes; percentage of large lymphocytes normal; no giant lymphocytes with protruding globules of hyaloplasm; slight increase in percentage of phagocytes and eosinophile cells; many phagocytes with transparent nuclei; small number of lymphocytes show evidence of disintegration; very little debris from disintegrating cells; marked

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disintegration of red cells; fragmentary cells, poikilocytosis, microcytes, megalocytes, large, light, delle showing marked decrease in haemoglobin. From the above blood appearance, I returned the following written diagnosis: "Blood examination contra-indicates tuberculosis, but rather indicates marked primary or secondary anaemia."

The history of the case was then given by Dr. Axtell, which is as follows: Miss L., age 24; born in Germany; in Colorado since 1895. No history of tuberculosis in family, except in one cousin. Patient has always had good health, except for malaria. She consulted me June 12, presenting marked anaemia, and giving the history of feeling bad for one month, being languid, dizzy, with no appetite, slight headaches, indigestion, and constipation. I diagnosed the condition "malarious anaemia," patient having had her last attack of malaria in the fall of 1895. I took her to Dr. Holmes as *a test case*, thinking her anaemia might present similar blood appearances that he has described as appearing in tuberculosis. He reported, "Not tuberculosis."

SUMMARY OF CASES.

Incipient pulmonary tuberculosis, 1 to 7.
Incipient laryngeal tuberculosis, 8 and 9.
Convalescent pulmonary tuberculosis, 10 to 14.
Advanced pulmonary tuberculosis, 15 to 21.
Fatal cases of pulmonary tuberculosis, 22 and 23.
Fatal case of tuberculous meningitis, 24.
Last stage of pulmonary tuberculosis, 25.
Surgical tuberculosis:
Tuberculous periostitis, 26.
Tuberculous necrosis of spinal vertebra, 27.
Tuberculous hip-joint disease, 28.
Tuberculous knee joint, 29.
Tuberculous adenitis, 30.
Pretuberculous, 31 to 34.
Non-tuberculous, 35.

It will be observed that there is no single characteristic in tuberculous blood which, if once learned, will enable us to diagnose the disease. We may have, and generally do have—ex-

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cept in well advanced cases—three conditions of the cells existing at the same time, and found in the same specimen: Cells in the (a) normal condition, (b) beginning disintegration, and (c) advanced disintegration. It must be remembered, also, that there is no distinct dividing line between them. They blend insensibly into each other. Experience alone will enable us to educate the eye to distinguish these varieties.

In the study of tuberculous blood we should not only ascertain the percentage of each type of leucocyte, but also classify each type according to the

DEGREES OF DISINTEGRATION.

Beginning disintegration is characterized by a rupture in the contour of the cell with globules of hyaloplasm passing out, leaving a depression in the cell corresponding to the amount of tissue lost; cell contour partly destroyed.

Complete disintegration is characterized by complete breaking up of the cell into small masses, and these scattering; cell contour entirely destroyed.

Many leucocytes in tuberculous blood do not show evidence of either of these forms of disintegration, but possess characteristics which I have interpreted as meaning lowered vitality, weakened functions, and

DIMINISHED RECUPERATVE POWER.

These characteristics are: (a) poorly stained or transparent nuclei, (b) granules of phagocytes diminished in number, poorly stained, and scattering, and (c) a decrease in the number, or a marked disintegration of the eosinophile cells.

In many cases these characteristics predominate, while in others they are present only in a small percentage of the leucocytes.

Although the eosinophile cell continues to be enshrouded with much mystery, the recent researches of Kanthack and Hardy, of Cambridge, have undoubtedly given us much light upon the subject. They claim that the eosinophile cells are the advance guards of the phagocytes. The eosinophile cells first surround the bacilli and throw off some of their granules, or secrete a substance which renders the bacilli inactive, and

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while they are in this state the phagocytes surround and devour them. Therefore, with this interpretation of their function, in any germ disease where there is a decrease in the number of eosinophile cells, or a marked disintegration going on in them, the recuperative power of the organism is greatly diminished. Hence, a study of tuberculous blood should reveal two important points: First, the degree of the tuberculous condition; second, the degree of the recuperative power.

Although the first of these is important, yet we must grant that it is equally important, both to the patient and to the physician, if we can ascertain the amount of recuperative power possessed by the patient. For, upon this depends the probable chances of recovery, or combatting the disease.

If our fundamental hypotheses be correct; if the individual has a true prototype in his leucocytes; if the condition of the one can be interpreted from the appearance of the other; if the leucocytes are tissue formers; if it is true that, as are the leucocytes, so is the individual; then, *the real source of the recuperative power must be sought for in the leucocytes.*

After carefully studying and comparing the blood appearances found in all varieties of tuberculosis, I have observed that the nearer the blood characteristics approach the following, the more it contra-indicates tuberculosis.

CHARACTERISTICS OF NORMAL BLOOD.

Normal or approximately normal percentages of all varieties of leucocytes.

Absence of giant lymphocytes.

Absence of myelocytes.

Very little cell disintegration.

Very little debris from disintegrating leucocytes.

Well stained nuclei.

Phagocytes with cell body clearly defined, and granules rich in number and well stained.

Uniformity in size and appearance in phagocytes.

While, on the other hand, the following are the

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CHARACTERISTICS OF TUBERCULOUS BLOOD,

Which vary according to the severity of the case:

Marked deviation from the normal percentages of all varieties of leucocytes.

Decrease in percentage of small lymphocytes.

Increase in percentage of phagocytes.

Usually a marked increase in percentage of large lymphocytes.

Many giant lymphocytes with irregular contour and protruding globules of hyaloplasm.

Eosinophile cells absent or few in number—only in severest cases.

Myelocytes occasionally present.

Marked cell disintegration.

Many groups of debris from disintegrating leucocytes.

Phagocytes with indistinct cell contour, and granules few in number, poorly stained, and scattering.

Marked irregularity in size and appearance of phagocytes: Dwarfed phagocytes, small as small lymphocytes; giant phagocytes, double the usual size, with five or more nuclei.

Often a clear, narrow and sharply defined ring separating the nucleus from the cell body in small and large lymphocytes.

Phagocytes with granules taking a basophile tint—evidence of approaching dissolution.

The grouping together of a large number of phagocytes—observed before dissolution.

Very little disintegration in red cells.

From a review of the blood appearances in the foregoing cases, I believe I am warranted in making the following

DEDUCTIONS.

First—That the degree of the tuberculous condition can be estimated by (a) the amount of deviation from the normal percentage of each variety of cells, and by (b) the amount of cell disintegration in each variety.

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Second—That the degree of the recuperative power can be estimated by (a) the staining power of the nuclei, (b) the percentage of leucocytes with no evidence of disintegration, (c) the abundance of well stained granules of the phagocytes, and (d) the abundance of eosinophile cells rich in granules.

DIFFERENTIATION.

With reference to the differentiation of the various stages of tuberculosis, much could be given; but time and space will not permit in this paper. I will, however, give a few points which are most prominent, and probably may be the means of differentiating the pretuberculous, incipient, advanced, and convalescent stages of the disease.

But, in the first place, sufficient blood charactistics must be observed, to justify the opinion that the tuberculous condition exists. It is then time to look for those points which are characteristic of, and will enable us to designate, with reasonable certainty, the class into which the patient is to be placed.

The following tables will show quite plainly the peculiar percentage variation for small lymphocytes and phagocytes in the various stages of the disease:

TABLE II.

PRETUBERCULOUS CASES.

CASES.	31	32	33	34	Normal Percentages.
Percentage of Small Lymphocytes.....	25	22	8	12	26
Percentage of Phagocytes.....	57	65	70	74	65

In pretubercular cases—those who have not yet developed an active lesion—the percentage of small lymphocytes is normal or sub-normal. And simultaneously with the decrease in small lymphocytes there is an increased percentage of phagocytes.

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TABLE III.

CONVALESCENT CASES.

CASES.	10	11	12	13	14	26	28	Normal Percentages.
Percentage of Small Lymphocytes	26	23	31	37	32	35	23	26
Percentage of Phagocytes	51	59	63	53	53	52	60	65

In convalescent tuberculosis the percentage of small lymphocytes is approximately normal or above normal. And simultaneously with the increase in the percentage of small lymphocytes, there is a decrease in the percentage of phagocytes.

TABLE IV.

SHOWING RANGE OF PERCENTAGES FOR PRETUBERCULOUS AND CONVALESCENT STAGES.

	Percentage of Small Lymphocytes.	Percentage of Phagocytes.
Normal state		65
Pretuberculous Condition	8 to 25	57 to 74
Convalescent Tuberculosis	23 to 37	51 to 63

TABLE V.

INCIPIENT CASES.

CASES.	1	2	3	4	5	6	7	8	9	Normal Percentages.
Percentage of Small Lymphocytes	7	13	16	11	13	9	12	12	16	26
Percentage of Phagocytes	73	71	74	77	74	66	74	74	70	65

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TABLE VI.

ADVANCED CASES.

CASES.	15	16	17	18	19	20	21	27	30	Normal Percentages.
Percentage of Small Lymphocytes	8	7	7	8	8	10	9	7	9	26
Percentage of Phagocytes.....	81	87	74	81	80	80	82	80	77	65

TABLE VII.

CASES IN LAST STAGE.

CASES.	22	23	24	25	Normal Percentages.
Percentage of Small Lymphocytes.....	5	6	9	9	26
Percentage of Phagocytes.....	89	81	73*	80	65

*Tuberculous meningitis an exception.

TABLE VIII.

SHOWING RANGE OF PERCENTAGES FOR THE ACTIVE DISEASE.

	Percentage of Small Lymphocytes	Percentage of Phagocytes.
Normal state.....	26	65
Incipient Tuberculosis.....	7 to 16	66 to 77
Advanced Tuberculosis.....	7 to 10	74 to 87
Last stage of Tuberculosis.....	5 to 9	80 to 89

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From these tables we may make the following

DEDUCTIONS.

First—As the tuberculous condition becomes more marked, and the gravity of the case increases, the percentage of small lymphocytes decreases and the percentage of phagocytes increases.

Second—As the tuberculous condition becomes less marked, and the convalescence increases, the percentage of small lymphocytes increases, and the percentage of phagocytes decreases.

Many other deductions might be made from the tables with reference to the physical condition of the patients. For example, in all cases in which the blood shows the usual characteristic tuberculous condition, and at the same time an increase in the phagocytes to 80 per cent. or over, it is quite safe to diagnose advanced pulmonary tuberculosis, with cavity, profuse expectoration and abundant bacilli; or, if surgical tuberculosis, an abscess, with more or less discharge of pus.

I do not wish to be understood as saying that all of the appearances that I have described are necessarily present in each case of tuberculosis. Neither do I wish to say that many of them are not found in other diseases. But I do claim that a peculiar combination of blood appearances is characteristic of this disease, to the extent that will enable us to make a diagnosis at an earlier date than by any other means that we now possess. It is quite probable that the near future will justify a stronger statement; that from the blood condition we will not only be able to diagnose tuberculosis, but that in many cases it will enable us to distinguish the various stages of the disease. And hence, will be a valuable means of following the course of the disease under various methods of treatment.

In conclusion, I will review with the following

SUMMARY.

That the diagnosis of tuberculosis, from the morphological appearance of the blood, rests upon the hypothesis that each individual has a biological prototype in the leucocytes of his own blood; that leucocytes are independent organisms, with functions analogous to those of the larger organism; that they

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pass through stages of growth and decay; that disintegration of leucocytes may occur at any age; that the leucocytes are tissue formers; that as are the leucocytes, so is the individual; that tuberculosis is a disease characterized by tissue disintegration; that in tuberculous blood there is abundant cell disintegration, premature development, premature decay, and more or less deviation from the normal percentages of the various types of cells; that if there is disintegration in the leucocytes, it is with certainty that we can predict a similar condition in the larger organism; that tuberculosis possesses a combination of blood appearances, from which a diagnosis may be made earlier than by any other means that we now possess; that these may be recognized by appropriate micro-chemical stains and a high magnification; that they can be recognized even before the disease manifests itself in the individual; that they are sufficiently marked in tuberculous persons, or even in those with a strong tuberculous predisposition, to enable a diagnosis being made from the blood alone, without knowledge of the history or physical condition of the patient; that the real source of the recuperative power is to be found in the leucocytes; that thus far no other pathological condition has been found which presents similar blood appearances; that to secure an early diagnosis would enable many to avail themselves of favorable climatic changes, and thereby delay, or even prevent the destructive results which would otherwise inevitably follow; and, finally, that if future investigations confirm these deductions, we may look forward to a no distant day, when, if we expect to detect tuberculosis in its incipiency, we must study the leucocytes.

DISCUSSION.

Dr. W. W. Grant—I understood that Dr. Crouch was to be here to participate in the discussion of this paper, and am sorry that he is not. I am especially desirous of hearing his criticism of this subject. As he is not here, I wish to say a few words only. I think the paper of Dr. Holmes shows much original research and hard work. It is one that the great mass of medical men and general practicing physicians and surgeons do not care to engage in. It requires time, much

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tedious labor, knowledge, industry and perseverance. Of course it is a paper of scientific interest; whether it is of practical value is the question which concerns us now a moment. I see no reason from analogy why, if we can with the microscope detect the bacillus in the sputum, and by that determine that it is a case of tuberculosis—why that condition should not carry with it the specific condition of the blood itself; I mean a condition peculiar to that disease, as the blood of syphilis carries its germs; and if this work can show a constant relation, or quite constant relation to the development of tuberculosis, even before the bacillus can be detected in the sputum, it is a work of inestimable value, and one that will redound to the credit of him and the profession everywhere. I personally know that in some of the cases which Dr. Holmes has examined, he has with marvelous correctness diagnosed the cases that cannot ordinarily be done by the microscope, and it has attracted my attention. I have referred cases to him about the history of which he has known nothing whatever—some with hereditary disease well marked—yet not a particle of tuberculosis can be detected from the sputum, or in a physical examination; and yet he has found a condition of the blood and reported the case to me which confirmed my own opinion, based upon simple observation. I think this is a work of immense value, if it can be generally done, because it enables any one with a tendency towards tuberculosis, whether hereditary or acquired, to be fore-warned in time, and to apply themselves to the only resource which at the present day has any influence in permanently arresting tuberculosis—and that is climate. They can take advantage of this in any part of the country or world in time; their lives can be saved and perpetuated, for usefulness or not; but certainly if that much can be accomplished it is a grand achievement.

Dr. Denison—Many of you are aware of the great interest I have had in this subject which Dr. Holmes has taken up, and I wish to refer to an action taken by this society two years ago, which was quite unanimous, in inaugurating this investigation of the microscopic study of the blood, by a resolution which I had the honor to introduce, offering an award of $100, which was open to any one, anywhere, for the best essay on

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the diagnosis of tuberculosis by the microscopic examination of the blood, a criterion being given that the diagnosis should be made and the differentiation of different kinds of tuberculosis should be effected without the patient being seen—that is, from the blood alone. A committee was appointed, consisting of Dr. H. A. Lemen and Dr. Solly and myself, as a committee on award. I tried myself to get some of the gentlemen who had worked in this field, and who had made some claim in reference to the matter, claiming that they had a diagnosis of tuberculosis by a microscopic examination of the blood, to present their proofs, but no essays were offered. The action of this society was widely made known, both through the reports of the society and in the paper which I had the honor of reading at the time, and no answers were given. Now, Mr. President, it has given me great pleasure that Dr. Holmes has undertaken this matter, and I feel like a prophet in saying that I believe he is on the right track, and that he is likely to succeed; and I rise to make a motion that this committee, of which I have spoken, be continued, and enlarged if you see fit. I will add to my motion that since Dr. Lemen, whom I have seen this morning, is ill, and cannot be here to participate in the work of the committee, and Dr. Solly, as you know, lives in Colorado Springs, our committee perhaps ought to be strengthened by some other good men who live in Denver; for here our work will be. I will enlarge my motion by adding that Dr. C. A. Powers and Dr. E. R. Axtell be added to our committee, and that it and the award be continued for another year.

In reference to this motion I wish to make a few remarks. If we can succeed in carrying out this measure, we have done something which every member of this society can feel proud of. This small matter of the award is nothing; but the success of the undertaking is worth millions of dollars to the medical profession, and the simple amount of about thirty cents apiece for every member of this society to encourage this matter is nothing at all compared with the great good which can be accomplished. If it is true, which I believe Dr. Holmes has in his mind proved, that the life and conditions of the cells in the blood are simply a new world which we are to investigate; if the life and conditions, the reactions of the different stains,

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are proofs of diseased conditions which can be made known, we have a new field for enlightenment, and a new field of work for the superabundant number of physicians which our colleges are turning out. Thus we can come up onto a different plane, because we have yet to learn that tuberculosis is the chief disease which will be studied in this way. Latent tuberculosis especially, I believe, runs into—as you all believe, I think—into scrofula on the one hand, and syphilis on the other, and they are to be differentiated by the life conditions of these cells, or germs, which are to be studied from microscopic examinations of the blood. I therefore hope that you will feel as I do about it. All that we can do is very little compared with the great good which may result. The work of the committee will be arduous, for whoever gets this prize, should be able to answer these conditions, which you will see are rather severe. Ten patients, for instance, in another room, representing the different types of tuberculosis; tuberculosis running towards fibroma; tuberculosis in adenoid growth; tuberculosis in miliary form; tuberculosis in inflammatory conditions, and tuberculosis of different form, all represented, for instance, by a drop of blood from each patient's finger, brought into another room and the diagnosis given of these cases and the forms told by that examination alone. To be fair, the examiner should not see the patients, or at least not know anything about their history. It may be that he will require that he shall take the blood himself; that can be accomplished by simply exposing through a curtain a finger, and each patient have a drop of blood taken, if we are going to be as strict as this. I believe this diagnosis can yet be accomplished, and it has been my hope for many years that this would be added to what we now know of tuberculosis.

Dr. Grant—In seconding this motion of Dr. Denison, I should like to say that I knew nothing whatever of this committee, or had forgotten about it and the award. I supposed, of course, and thought that Dr. Holmes was working regardless of any such end in view, and would continue his investigation, regardless of that committee; still I think it is perfectly fair, and certainly if anything is accomplished, or good done,

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it will redound to the credit of the society as well as the worker.

Motion of Dr. Denison was thereupon put and carried.

Dr. E. Stuver—I was highly interested in Dr. Holmes' valuable paper. It appears to me that this subject of investigating the condition of the vital fluid, on which depends the life of the whole system, is one of the very greatest importance. If we can definitely settle the condition of the blood in a particular disease, we will have some foundation on which to work. There was another point in connection with this paper —viz., the generalization or fact that the cell passes through different stages of evolution; that is, through stages of youth, maturity and decay, which can be applied with very good results in all stages of development. I think that the man who has a clear conception of the fact that the human body, as well as the cells which compose this body, passes through different stages of development, and is differently affected by its environments during these several stages of development, will be enabled to treat disease more intelligently than if he did not possess that particular knowledge. If he also has a clear conception of this same generalization as applied to larger masses of individuals—that is, not only that the individual, but also the race, passes through similar stages of evolution, that is, has a stage of youth, a stage of maturity, and a stage of decay—he will be a brighter and better physician, and will accomplish more good than he could without that knowledge.

Dr. Holmes—Mr. President, Ladies and Gentlemen: Before closing this discussion, I wish to thank the society for the courtesy shown me in extending the time which my paper required to be read, and especially for the courtesy you have granted to-day in allowing a free discussion of the subject. This subject is a very technical and difficult one. It is one to which I have devoted the greater portion of my time during the last year and a half. But it has only been during the last few months, however, that I have undertaken individual research in special lines. Since I commenced the study of the blood in tuberculosis, I believe I have discovered minute and delicate characteristics of the leucocytes which possess diag-

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nostic value in this disease. I am myself convinced of their constant appearance and their unmistakable diagnostic significance. As you are all aware, it is too extensive a subject to arrive at perfection within the limited time that I have devoted to it. I make no claim to perfection. I simply have done the best I could to detect the peculiarities of tuberculous blood and to interpret their significance. Thus far, I have studied thirty-five cases, which cover every phase of tuberculosis, and a few cases that have no tuberculosis at present, but who possess a strong hereditary tendency.

I think it would be unwise for me to enter further into the technicalities of the subject. To one who has not given it special study, it is difficult to understand. I have not yet reached the point that I can look at a specimen of blood without seeing something that I am not able to comprehend. It is only by constant work and by making a careful study of a series of similar cases that we can discover the peculiarities common to any disease, and attach to them any special significance.

I appreciate the interest that you manifest in this subject, and thank you for the discussion. But before I close I wish to say that no monetary consideration has inspired me to this work. It was simply for the love of the science, and with the belief that the field contained its own reward. If the blood appearances which I have observed and attempted to describe, prove to be a reliable means of diagnosing tuberculosis, I wish the credit—if any credit comes from it—not for myself, but for the Colorado State Medical Society.

THE MICROSCOPICAL PROOF OF A CURATIVE PROCESS IN TUBERCULOSIS; OR THE REACTION TO TUBERCULIN EVIDENCED BY BLOOD CHANGES HITHERTO UNRECOGNIZED.

CHARLES DENISON, A. M., M. D., DENVER, COLO.

There is urgent need of a gauge to go with treatments claimed to be curative in consumption, by which their relative merits may be determined. There is no lack of "cures," so-

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called. "The woods are full of them;" but the limitation of the curative process common to most of them has never been accurately determined.

Thus far climate—and the preferable climate is on this eastern Rocky mountain slope—has proved to be first in the list of remedial means; however, its curative power is increased by other agencies.

The latest claim to curative fame—aseptolin—is by no means an exception to this estimate. The treatment has some merit in it. However, the profession will grant much of the credit to the Frenchman, Declat, who many years ago put forward the hypodermatic use of phenol, and to Dr. Louis Waldstein, of New York, who in Berlin made prominent the similar use of pilocarpine, as well as to Dr. Cyrus Edson who, by combining them, has lately "boomed" the new remedy—aseptolin—into extended use. Yet the effects have to be acknowledged as considerably limited and not so different in kind as we would wish, from those produced by the Shurly and Gibbs method, with chloride of gold and iodine, the effort to saturate the system with creosote, etc.

Tuberculin, and antipthisin (Kleb's), which is considered by some (Trudeau and Baldwin) only a modification of it, has not yet impressed the medical profession with its great worth as a means of treatment, for reasons the profession are probably responsible for, though as a diagnostic of tuberculosis its position is well recognized by veterinarians. It is, therefore, very gratifying to have the hope revived that there may be found a trustworthy means of comparing and judging these curative methods through the microscopic examination of the blood.

Perhaps the members of this society have in mind the resolution I had the honor to propose two years ago, offering a reward or prize of $100 for the best essay presented a year hence upon this subject. To be sure the pecuniary inducement offered was too small, and that may have been one of the reasons why the task was not undertaken. Yet the honor, if successful in such a magnificent undertaking, was then, and is still a sufficient inducement to excite the energies of any one able to accomplish the task. The purpose is *to diagnose tuber-*

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culosis and differentiate its varieties by the microscopic examination of the blood alone, without the patient being seen.

You have heard Dr. A. M. Holmes' paper, and are, I trust, prepared to join in encouraging him to succeed in this matter. I hope the pecuniary consideration may be renewed by this society and another year's opportunity be given Dr. Holmes, or any one else who will enter the lists with as original and conscientious work as is evidenced in his paper. The honor is one we would all feel proud to have conferred upon a Colorado physician, and it seems that Dr. Holmes is very near the goal.

It was to apply his method of staining and blood examination in order to determine the cell changes induced by the reaction to tuberculin, that I asked Dr. Holmes to study with me two of my cases some ten weeks ago. The results are new, and I am gratified to present them to you in so clear a form, considering the short time the study has been in progress. Much credit is due Dr. Holmes, for I am unaware that just this method of study and comparison has been carried out by any one else. A short history will enable us to comprehend case one, which was primarily a pulmonary, and afterward a surgical tuberculosis affection.

Case 1—Male, age 38, first seen July 26, 1895; a banker, married eight years, just arrived from Vermont. His mother, whom the patient much resembled, died of consumption. This patient had la grippe two years previously, followed by cough, and last winter another attack, when he had night sweats. Weight about 150; not decreased, because of good living and care; only slight effect of elevation; cough not severe; expectoration whitish, about one ounce in twenty-four hours and containing tubercle bacilli, three to five to field, streptococci and diplococci. Some infiltration and dullness at left apex, and very slight impairment of respiratory sound on right side. Diagnosis—Fibro-tuberculosis, first stage. Treatment—To use the inhaler, because of the bronchitis and mixed infection, and to go into the mountains.

September 6—Has been at Idaho Springs and improved somewhat. Spirometrical record has increased from 205 to 225 cubic inches, and manometer record from 95 to 110 M. M.

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December 19—Commenced tuberculin (Koch's) September 9, with ultimately gradually increasing intervals between the injections. The reactions were light and only occurred after a few of the smaller doses. About 60 mgrs. as a maximum dose was reached. The sputum cleared up (the germs disappearing), and finally ceased altogether.

April 14, 1896—Up to February 7, the lung condition continued most favorable, but the tuberculosis had not been wholly eliminated from his blood, for a small abcess then came underneath the scalp above the forehead, the pus from which was found to contain tubercle bacilli; also, perhaps following a strain of right arm and much pain which kept him awake nights, an abcess formed and infiltrated the tissues below the right elbow joint. These conditions both improved under drainage, the renewal of tuberculin and the administration of hypophosphites with hydriodic acid. The scalp abscess has healed entirely, but the trouble in the arm evidently comes from tuberculous necrosis and will necessitate an operation.

April 15, 1896—Dr. J. J. Powers operated on the right elbow and we found, as we expected, necrosis of the ulnar (both front and back sides of it near the end), the joint, perhaps, just escaping.

A conservative plan was decided upon—to rather freely expose and scrape the diseased bone, after which the wounds were thoroughly packed with iodoform gauze.

June 13—The dressings were continued until the wounds had healed by granulations from the bottom. During the time of and preceding the operation on the elbow for three or four weeks, no tuberculin was given, and it was during this period when the necrosis of the ulner was well under way, that the first blood examination—namely, that of April 11—was made by Dr. Holmes, indicating, as he stated, a serious inflammatory state of the blood and some bone affection—i. e., "an excess of bone marrow or spleen activity." The tuberculin was continued and given about every fourth day, from about the first of May to date, in gradually increasing doses, from 20 to 70 miligrams for a maximum dose, till there was finally no reaction to speak of to those larger doses. This was during the time the other four blood examinations were made, the in-

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crease of the young or new cells, the small lymphocytes, being in exact hormony with a decided improvement in the patient's condition in every way—in weight, appetite, strength, feelings, mobility of the affected joint and ability to exercise. It is hoped the apparent, though perhaps only approximate, immunity reached in this case will prove to be of a permanent nature, as has been the case in quite a number of patients treated from one to five years ago. Of course these were selected with all the care and precaution possible as suitable for this method, for none others, in my judgment, should ever be given tuberculin except for diagnostic purposes. The progress of the above case, and of the one yet to be described, together with the numerical changes in the proportion of the various cells of the blood, is shown in the accompanying table which Dr. Holmes has kindly prepared for me. To this is appended about the normal proportion of the different cells according to Neudorfer, of Vienna, for the purpose of comparison.

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RECORD OF BLOOD EXAMINATIONS.

	Small Lymphocytes.	Large Lymphocytes.	Neutrophyle Leucocytes.	Eosinophile.	Myelocytes.	REMARKS.
About the normal	26	8	65	1	0	
CASE I.						
April 11. Necrosis forming	6	21	72	½	1	Average of 500.
May 6. 2½ hours after tuberculin injection	9	17	72	2	0	" "
May 8. 10:30 A. M., just before an injection	11	20	66	3	0	" "
May 8. 7:30 P. M., 8½ hours after an injection	18	16	64	2	0	" "
May 19. 7 days after an injection	32	13	53	1⅓	0	" "
CASE II.						Note increase of small lymphocytes.
April 13. 5 P. M., before treatment	7	19	72	1	1	
April 14. 5 hours after injection, 4:30 P. M.	16	10	73	½	1	
April 15. 30 hours after injection, 5:30 P. M.	16	16	66	1	1	
May 16. 7 hours after injection, 5 P. M.	21	7	72	0	0	External retrograde metamorphosis.
June 10. Third day after injection, 10 A. M.	9	13	77	0	1	Evidence of pus formation and retrograde metamorphosis external.
CASE III.						
About June 8, before test with tuberculin	8	21	70	1	0	Evidencing tuberculosis.
June 17, next day after second reaction to tuberculin	17	13	70	⅓	0	Increase of small lymphocytes and tissue metamorphosis.

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Case 2—Miss ———, age 22, first examined by me February 17, 1896. Both the patient's sisters are possibly tuberculous, mother frail, and mother's two brothers and one sister died of consumption. Previous to coming to Colorado from Maine, which was about seven years ago, she had neuralgia, some cough and fever, was weak and sick, and had yellow expectoration at age of sixteen. Greatly improved, and catamenia became regular in Colorado. She ceased expectorating after one month. When eighteen years old, glands in both axillae swelled; these disappeared in three years. But before that, namely two years ago, the hard lumps came on the right side of the neck, and one year ago on the left side. There must be as many as twenty on the right side, reaching from the ear to the middle third of the clavicle and nearly as far down on the left side. Those on the right are the largest, causing marked deformity, and two of them are commencing to suppurate. There is little or no expectoration, some slight daily temperature rise, spirometrical record 130 cubic inches, and manometer record 60 M. M.; weight before coming, 105, now 123 pounds; expansion, 29 1-2 and 31 inches, a little greater deficiency on the right than on the left side. Remnants of enlarged glands noted in both axillae, some depression in right infra clavicular space. Physical examination revealed no rales or breaking down of lung tissue, but broncho-vesicular breath-sounds, some dullness and exaggerated voice at both apices, front and rear, with prolonged expiration in right infraclavicular space. The diagnosis was strumous phthisis, so-called, which was proved immediately afterward to be tuberculous by the tuberculin test. The local reaction was positive, known by the high-pitched broncho-vesicular exaggeration in the left interscapular space. This was noted after the 6 mgr. tuberculin dose, and afterward it was quite general over the lungs. The glands in the neck also began to get harder, and there was temperature reaction which seemed to become excessive, showing extreme susceptibility. The test was stopped to prepare for the enucleation of the glands, and thus get rid of so much tuberculous tissue. This operation was performed by Dr. J. J. Powers, assisted by Drs. O'Connor, Pedersen and myself, April 29, and some seventeen to twenty glands

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were nicely enucleated. It was before and after this operation that the blood examinations shown in the table were made, in connection with very small and infrequent doses of tuberculin.

The value of these examinations made by Dr. Holmes was manifest, showing the coincidence of an abnormal susceptibility and the excessive tissue metamorphosis which was going on. Notwithstanding other signs of improvement in this patient's condition, this discovery contra-indicated the pushing of such treatment with so much tuberculous tissue to be gotten rid of, and the moderate use of antiphthisin (Klebs) was substituted, with mild inunctions of the oleate of mercury and the internal administration of syrup of hypophosphites and of hydriodic acid. This is preparatory to the extirpation in the near future of the rest of the glands, on the left side. This obstinate diseased condition is of the more interest because of its persistence and the profound infection of the system, as well as because it shows that the glandular enlargements we have always thought to be scrofulous, are profoundly tuberculous, though, as in this case, no bacilli are found in the glands removed. Note—September 8, 1896. These two cases have each continued to recover since these reports were made. Both show increase in weight, etc. In the second case, the glands on left side of the neck and in right axilla have shrunken so much that the patient requests a postponement of any further operation, believing she will recover without it.

This verifies a statement I have previously made, based upon our inability to find the bacilli tuberculosis in tissues evidently tuberculous, as in adenoid growths in the region of the third tonsil in patients afterward dying of tuberculosis—namely, that there is a pre-tuberculous state, of which some evidence besides the bacillus of tubercle must be found. Whether that evidence is to be found, as for a long time I have hoped it would be, in the proper microscopic examination of the blood, or as I believe it does exist in the tuberculin test, there is no doubt in my own mind that the two methods will go hand in hand and verify or check each other, just as surely as do the control tests of the assayers in our sampling works.

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A beautiful illustration of the value of both these tests is now given us in another of my cases whose blood has just lately been examined by Dr. Holmes. (See Case III.) I refer to the case he describes in which I could find no bacilli in the sputum, and had diagnosed bronchitis and hydro-nephrosis and possibly latent tuberculosis. But Dr. Holmes was sure from the morphological appearance of the blood that the case was tuberculous, he knowing nothing of the kidney complication. I have since tested this patient with tuberculin and obtained a distinct reaction, proving Dr. Holmes' diagnosis to be correct.

The morphological state of the blood indicates an enlarged spleen and tuberculous kidney. At the same time a diagnosis of tuberculous adenoma of the kidney, complicating hydro- or pylo-nephrosis, and perhaps calculus, seems to be warranted by the gross appearance of this tumor. It reaches from the spine around to within three inches of the navel and from below the sixth rib in front to within two inches of the crest of the ileum, with oval borders. This conclusion is supported by the history of hemorrhages and the discharge of pus in the urine, and the fact that he has lived as a miner in high altitudes for thirty years, excepting short sojourns in the East, during one of which, at the world's fair in Chicago, his principal attack occurred. Note. September 8. This case has also improved under the tuberculin injection; general condition better and tumor lessened in size.

What will be done with this tumor other than to continue the present favorable course of tuberculin is not yet determined. The patient is, however, present, and suggestions will be gladly received. The tumor seems to have commenced to decrease in size since the beginning of the tuberculin test. I have given this patient an injection this forenoon that you might now the better detect the *reaction sound*, which will be found in the left infrascapular space.

As to tuberculin: I was much impressed by Dr. Hance's statement in his late paper on the treatment of pulmonary tuberculosis (Medical Record, May 2, 1896), which verifies my own experience, and which I will quote in closing:

"The writer recalls at least four patients who could not continue the use of tuberculin, but subsequently arrested their

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disease process under proper climatic treatment. After the continuous use of tuberculin, or its modifications, extending over a period of nearly five years, he is of the opinion that patients who are "relatively cured" by the use of tuberculin and climatic treatment have stronger resisting powers against subsequent infection than those who have secured the same results by climatic treatment alone. In other words, their cure (if one may use such a term) is much more firm and lasting than in other cases.'

THE SANITATION OF MINES.

J. W. EXLINE, M. D., DENVER, COLO.

The object of this discursive paper is to call attention to a subject likely to be overlooked by medical gatherings of the present kind. In the half score of years in which I have attended the meetings of this society, I cannot call to mind a single instance in which the question of mines and mining, in their sanitary relations, was made the topic of a single paper. The reasons for this are obvious enough, and I will not stop to enumerate them. As the purveyors of such knowledge as tends to the improvement of the physical status of our fellows, we are guilty of dereliction when we neglect sanitary matters, and fail to urge the application of hygiene to the conditions that surround us.

Among the varied occupations of the industrial world, that of mining takes prominent rank. Statistical data inform us that the *coal* product of the globe is about 260,000,000 tons; of this vast amount, our own union of states represents 149,000,000. Geologists tell us that the coal-bearing strata of Colorado exceeds 44,000 square miles. Some one calculates that if our coal deposits could be spread evenly over the state of New York, it would cover every foot of the Empire state to a depth of seven feet. Observing ones aver that Colorado mines and ships to contiguous states a million tons of coal every year.

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The world produces about one hundred millions of dollars in gold annually, of which sum the United States is credited with at least two-fifths. The yearly output of gold for our own state has been placed at twelve millions of dollars, which sum was increased last year by more than six and a quarter million dollars. Colorado's output of gold and silver for the year preceding last was thirty millions of dollars. Since Leadville became a shipping camp it has produced a total of two hundred millions of dollars of the precious metals. The difficulties under which such vast treasures of gold, silver, and coal are released from their hidden places within the earth, to say nothing of the lead, tin, copper, marble, stone, iron, clay, and other deposits, taken by physical and mechanical force from beneath the soil, must require the exercise and expenditure of a tremendous amount of vital energy; and besides, the wear and tear natural to such exercise compromise the health and endanger the lives of the thousands of our fellow-men engaged therein.

Upon the morbidity of mining, as an occupation, the literature of the New World is surprisingly meagre. One searches in vain if he expects to find more than a mere allusion to the sanitary influences of mining in any one of our American works on the subject of Hygiene.

In the Old World, where humanity travels at a milder pace, time is taken to consider these things, and the reports of mining bureaus are more voluminous. In the metalliferous mines of Great Britain the fatalities from accidents alone are over one thousand annually. Of every one thousand coal miners in the same country, two and fifty-seven hundredths meet an untimely death by accident. In the metalliferous mines of Prussia the fatalities from accidents average one and fifty-nine hundredths for each one thousand employes. The yearly average of killed and wounded in and about the mines of Pennsylvania, during seven years observation, is reported at one and a quarter per cent. of the men employed.

But accident is not the sole menace to the well-being of the miner; his occupation shortens life by the infirmities it engenders. The diseases to which the miner is liable, in excess of his fellows, are those which affect the mucous membranes,

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the fibrous tissues of the lungs, the tendinous structures of the joints, and blood changes as evidenced by anæmia. The constrained position of the miner's body induces flexures and callosities, and the absence of sunlight certain ocular defects to which few vocations contribute to the same extent. By reference to the tables furnished us by Dr. Parkes, in his work on hygiene, we find that pulmonary troubles among miners are very much in excess of those which affect males employed at other work; and that the increase is progressively rapid with advancing years. He gives in confirmation of this statement facts compiled from data concerning the metal mines of Yorkshire, having reference, no doubt, to the county by that name. According to the figures given, the annual deaths for each thousand workmen from diseases of the lungs, between the ages of thirty-five and forty-five years, were eleven and thirty-six hundredths; while for the male population of the same ages exclusive of miners, the deaths were three and fifty-two hundredths. Between forty-five and fifty-five years, the mortality for the mining class was twenty-three and eighteen hundredths; exclusive of miners, five and twenty-one hundredths. For miners between fifty-five and sixty-five, forty-one and forty-seven hundredths; exclusive of miners, seven and twenty-two hundredths. For miners between sixty-five and seventy-five years, fifty-three and ninety-six hundredths; for non-miners, seventeen and forty-four hundredths. That is to say, the mortality of miners after thirty-five years of age is almost 400 per cent. greater than for the non-mining class of the same sex and the same ages.

In 1881 the male population of Yorkshire exceeded 1,400,000, and as it includes the principal mining districts of England, the observations were conducted on a large scale and ought to be conclusive. Another observer referred to by Parkes says that the three hundred thousand miners of England, as a class, break down prematurely from bronchitis and other pulmonary troubles.

Barring accidents, the principal cause of ill health on the part of the mining class is attributable to the atmosphere in which they work. This is not strange, for the air of mines is

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always more or less unfit for the purposes of respiration, unless kept pure by artificial means.

Carbon dioxide and carburetted hydrogen are by-products in the long process of coal formation, and of some of the other minerals as well. These gases remain imprisoned in pockets and crevices, sometimes under great pressure, until liberated by the disturbing force of the miner's pick and blast. These gases are the chief and unavoidable sources of contamination and danger. There are other means of defilement, also, which are not to be ignored; such as the respirations and exhalations of the workmen and animals employed; the slow oxidation of fine coal and debris; the exhaustion of oxygen by the miner's lamp; the vitiating effects of the explosives used; and especially the clouds of dust contributed to the air in the processes of mining. The elimination of all these factors of contamination is not possible. Efficient ventilation will minimize their effects if not render them wholly innocuous.

But ventilation is accompanied by many difficulties. The diffusion and dilution of gases, so rapid and energetic in the open air, is delayed and more or less hindered by the limitations a mine necessitates.

These conditions obtain in any locality circumscribed by impermeable barriers to the passage of air. For these reasons, the air of mines contains a large percentage of carbon dioxide, and a relatively low proportion of oxygen.

Angus Smith found as the mean of numerous experiments in metalliferous mines an average of seven and eighty-five hundredths parts of carbon dioxide to the thousand of air; or fully four per cent. more than authors on sanitation deem admissible for continuous respiration.

It has always seemed to me that ventilation is somewhat problematical under the most favorable circumstances that may require its application; but to ventilate an opening in the ground is a task to which no one should apply himself who does not possess technical knowledge concerning the intricacies of this important subject.

Some of the perplexities relate to the breathing space, which is usually circumscribed beyond our control; the speed required sufficient to furnish the requisite quantity of air

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without proving detrimental to the workmen by inducing colds or defeating the object of the safety lamp; for it is a matter of observation that few people can escape colds when subjected to a draft of air moving at a greater speed than three feet per second; and it is also known that the air of a mine contaminated with fire-damp to the explosive point, moving at a greater speed than eight feet per second, is capable of igniting, even in the presence of the safeguard devised by Sir Humphry Davy. Carburetted hydrogen renders air irrespirable when present in large quantities, and is violently explosive when mixed in definite proportions. The explosive point is reached much sooner than the toxic. One must understand the peculiar properties of this gas in order to insure safety to the men who work in it. Although carburetted hydrogen is constantly present in the air of poorly ventilated mines, the quantity varies at different times and at short intervals. It is found in large or small quantities, just as the pockets and crevices in which it is stored are penetrated by the advances of the workmen. Not only is technical knowledge requisite on the part of the mine inspector, but in the interim of his visits, constant watchfulness, with adequate means of ready detection, is necessary on the part of the workmen. Miners have been taught by sad experience that a low barometer means increased danger from fire-damp, owing to the low specific gravity of the gas as compared with air. For the same reason, mines located in elevated regions, as in a large portion of our state, readily experience the ill effects of the gas; since, when released by a change of environment, diffusion is facilitated by a rarified atmosphere. Under such conditions vigilance is the price of safety.

The laws of Colorado relative to the sanitation of mines are not as comprehensive as our knowledge of hygiene demands. The minimum air supply of 100 cubic feet per minute, though ample for an individual under the usual conditions requiring artificial ventilation, is not enough for the average miner. Dr. Parkes has shown that a man of average size, at hard labor, needs a supply of fresh air equal to 8,900 cubic feet per hour, or 2,900 cubic feet more than our statutes require. It is true the act referred to provides for an increase

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whenever it is deemed necessary; but the objection to the provision is that not one of the many conditions that ought to make an increase obligatory is alluded to.

In a matter of such vital importance a mere presumption of capability is not a sufficient guarantee of safety.

An appointee of political preferment, in the absence of specific requirements, may or may not be faithful to the interests of the workmen.

To determine the amount of air that should be distributed to each man involves more than one thinks who has not made ventilation the subject of study. He must take into account the superficies of the floor space; the cubic contents of the enclosure; the distance to the roof; the relative purity of the air to start with; the vitiating influences to contend with; the impediments to the displacement and diffusion of the atmosphere; the number, length, size, and shape of the air shafts; the situation, size, and shape of the inlets and outlets; the methods employed to remove the foul air and to supply the fresh; and other conditions peculiar to the formations and location of the mine.

Again: If a mine is worked by a lesser number of men than ten, then these men have no statutory protection. It is difficult to realize the justification for such discrimination.

The laws of Colorado are mute on the subject of explosives, except certain restrictions that apply to those substances while in transit; and the further requirement that the mines are not made a store house for them. Now, we all know that the handling of nitro-glycerine, under whatever form or name known to commerce, is attended with extreme danger; but for anything the law has to say, the most incompetent and reckless may be entrusted with the manipulation of these powerful agents, though the lives of hundreds are imperiled thereby. The blasting preparations of nitro-compounds explode the more readily and most violently by detonation; hence concussion, however produced, may prove sufficient to entail vast destruction of property and life, especially if the explosive has undergone some measure of decomposition. In practice, certain of the fulminates are used to produce the initial explosion. The fulminate of mercury is a very unstable compound,

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and explodes from slight friction or concussion, and requires intelligence and care in its management.

These nitro-glycerine preparations freeze at 40 degrees Fahrenheit or higher. They are unsuitable for blasting purposes while thus congealed. Many are the accidents that occur during the process of thawing them. A temperature of 120 degrees, applied as dry heat, may provoke an explosion, especially if the heat is applied rapidly. On the other hand, when heat is applied slowly in moist form, the temperature may be raised to the point of boiling water with comparative safety. The only safe way to thaw dynamite is to place the containing vessel in water of the required temperature. One of the advantages of dynamite over gunpowder is that it can be used in the presence of water; and yet when so used the dangers from it are multiplied. Moisture separates the nitro-glycerine from the earth with which it is incorporated, and in that condition the explosive agent is admitted in its mobile state to the crevices that may open into the hole drilled for the blast; thus exposing the workmen to unexpected upheavals when least prepared for them. It seems to me that the law should restrict the manipulation of these agents to those only who are acquainted with their active properties, and whose moral appreciation of their responsibility to their fellows has suffered no abasement.

The mucous membranes cannot for a long time resist with impunity the continuous impact of such angular bodies as compose the dust of mines. It is to these particles that "miner's lung" is due. Most of us have treated patients of this class, and know something of the pathology of this form of phthisis so prevalent among men who handle coal. It is an evil that cannot be wholly abated, but is susceptible of mitigation.

Nowhere in the industrial world can the science of sanitation, backed by legislative enactments to enforce its practice, do so much for a large class of bread-winners as when judiciously applied to the mining industry.

Inspector Williams, of Pennsylvania, in his report of 1877, stated that in his opinion fifty per cent. of the casualties classed as accidental could be prevented.

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Mr. Simon is authority for the statement that in the mines of Durham and Northumberland, where special attention is paid to ventilation, the workmen suffer from pulmonary diseases only slightly more than the non-mining class. I close this paper in the words of Mr. Shaeffer, in his article on the "Hygiene of Coal Mines," found in the supplementary volume of "Ziemssen's Encyclopedia:"

"The hygienic condition of American mines is receiving more attention and consequent improvement year by year, and that, if the average miner could only be taught to exercise caution and common sense about his work, the list of fatal accidents would be materially shortened, and mining would lose most or all of the terrors which now invest it in the minds of the general public."

MEDICO-INSURANCE, AND THE INTER-RELATIONS OF THE EXAMINER, APPLICANT AND INSURANCE BODY.

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Life assurance, with advancing civilization, is expanding into enormous proportions, so that the aggregated risks now being carried by all the insurance bodies operating in this country would give such a stupendous array of figures as, representing dollars, would almost stagger the imagination. The word "millions," in this connection, has lost its charm and is relegated to a dim and misty past. Billions alone can express the magnitude of the business now—over thirteen billions of insurance being in force at the close of 1895. And it is going forward at a far greater rate than is civilization itself.

The medical examiner being a factor in the process, the question is, "Does the medical profession (or the class of it identified with insurance) fully appreciate the responsibility laid upon it by the business, or, if appreciating, does it measure up to the requirements and fairly meet the obligation implied where such a vast sum of money is involved?"

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The four chief factors in the business are, the *agent* or *solicitor*, the *applicant*, the *medical examiner*, and the *company*, or *insurance body*.

The business of the solicitor is to secure the applicant, and from a mercenary standpoint, which is the ruling one, it is immaterial to him whether the applicant is a good or bad physical risk, so long as he can get him passed and recommended by the medical examiner, and accepted by the company.

The applicant, especially if anxious for insurance, is prone to magnify his sound physical traits and minify or conceal defects. The temptation to the latter is quite strong in many cases of partial invalids who are approaching the age limit of eligibility.

The insurance body is anxious to accept the risk if it is a good one, while just as anxious to refuse acceptance if it is a bad one. The intermediate risk (of which there is a large class), that is characterized by *some* defect preventing it from measuring up to the first-class standard, is the one that gives most anxiety to the company, puzzling it to know whether to accept or reject.

Inasmuch as the examiner derives no inconsiderable income from the business, he has more than a perfunctory duty to perform.

He is the trusted (but not always trusty) agent of the company, delegated to give not only an impartial but also a full and complete report, based on a careful, scientific examination.

The writer, from observation and experience, feels justified in the conclusion that medical men, as a class, do not give to this subject the study and attention that it merits.

Without some special study along this line, however competent in general practice, or in some other specialty, the physician cannot be an efficient examiner for life insurance.

Proficiency in this work also implies divorcement from social and professional ties between the applicant and the agent; elimination of the idea that examination consists merely in hastily writing out answers to the printed questions

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in a formal way, as a police justice or attorney would fill out a legal blank, and dismissing the applicant with "a lick and a promise" that he's all right.

It implies, further, a good degree of diagnostic skill.

There are three principal divisions of an examination: First, personal history; second, the family history; and third, the present physical condition.

Besides this, most forms have a preliminary application blank to be filled out by the applicant or solicitor, which usually contains the *age* and *occupation* of the applicant.

The rating is made on the showing of all these parts, and, contrary to the conception of some examiners, a risk does not necessarily have to be *first-class* to be safely insurable, nor necessarily rejected if not accepted for the full amount applied for. The actuary, in conjunction with his medical staff, estimates the life value of each risk that is proposed and, in so doing, takes into consideration the moral, as well as the physical, hazard.

The former is seen through the occupation, habits and environments.

A strictly first-class risk would show, in the report, an age of about thirty years; occupation, say clergyman; habits as to use of intoxicants and narcotics, untainted; mode of living, including sanitary environments, all the very best. Personal history or physical past and present would show freedom from any serious disease or from symptoms of habitual affection of any kind.

The family history would show parents living and in good health, or, if not living, dead from some acute affection or violence; grandparents, if not living, would be shown by report to have attained a good degree of longevity, or, if otherwise, death caused by acute disease or injury; brothers and sisters, good, robust health of the living, and no suspicion of hereditary disease terminating the life of the dead—in a word, the family history would show absence of a possible tuberculous, cancerous, or syphilitic taint.

Physical examination would show a healthy glow of the skin, a deep, well-developed chest and thorax, the special senses all normal; height, say five feet eight inches; and

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weight, 148 to 150 pounds; a measurement of about thirty-two inches in expiration, and thirty-six to thirty-seven in inspiration, with a lung capacity in cubic inches of 230 to 250, and girth of waist about thirty-three inches.

Pulse rate sitting about seventy, and standing seventy-four to seventy-eight; respiration rate about sixteen per minute; the heart, lungs and other viscera normal in location, size and function; the urine light amber in color, acid or neutral in reaction, with specific gravity of about 1020, and free from albumen, sugar or sediment.

All this, plus a vigorous vitality as expressed in his movements and general appearance, and plus a freedom from any mental or physical imperfection.

Such a risk as this would be an ideal one; but how few will measure up to this high standard! Deviations from this type will be found in perhaps ninety-nine out of every hundred examinations.

Take the one feature of occupation alone. One table, embracing twenty-three occupations, gives the comparative mortality of men twenty-five to sixty-five years of age, and the lowest death rate, that of clergymen, is taken as the standard, and is represented by 100. Lawyers are placed at 152, medical men at 202, farmers at 114, commercial travelers at 171, retail liquor dealers at 274, hotel service 397, butchers 211, brewers 245, and so on, this showing that occupation has considerable bearing on the value of a risk; and if the mortality of liquor dealers and hotel operatives is three to four times as great as that of clergymen, either their premiums must be more heavily loaded to compensate for this excessive mortality rate, or they must be accepted for a limited small amount, or they must be rejected.

The habits of an applicant, if steady, and he is free from excesses of any kind, strengthens the value of the risk.

On the other hand, if he is notably intemperate in the use of intoxicants, the risk is loaded with too much hazard to be accepted.

Between these extremes there are varying degrees of intemperance which will mar an otherwise possible first-class risk.

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There comes in the periodical debauchee, with possibly long intervals of abstention, as well as the steady, regular daily imbiber, but never, it may be, to intoxication, or to any degree of apparent subjective injury.

There is always the risk, though, of the moderate drinker passing out of his class into the ranks of the more notably intemperate, or, even without this transition, of sooner or later suffering lesion of important viscera by steady though moderate drinking. And there is danger of the periodical drinker shortening the intervals or intensifying the periods.

So that such habits always add an element of unsafety. And this element is difficult to estimate, though the value of the risk is reduced considerably in any case—more or less, according to degree and duration, and progressive or retrogressive character of the habit.

And the examiner in dealing with an applicant, if habit record is not clear, should elicit and note down for the guidance of the home office as definite information as possible—the amount consumed each day, week, or month, whether ever taken to the degree of intoxication, if so, how frequent and how prolonged the intoxication, whether the amount consumed is increasing from month to month or year to year, and whether there is any appreciable subjective or objective injury from the indulgence.

Even if strictly temperate now, has he in the past been intemperate. If so, how was reformation induced—by determined will power, or by dipsomania therapeutics—the so-called Keeley cure?

In this case the period and intensity of the habit should be stated, together with the result, including time of and since the reformatory efforts, and whether or not any deleterious results of former indulgence are discoverable in his constitution.

All this information is necessary as a basis for an approximate estimate of the value of the risk.

So, too, the narcotic habit, either of drugs or tobacco, to excess, if possessed by an applicant, may have a vital bearing, and the report should not leave the local examiner's hands till it contains complete data touching these matters.

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The drug habit, especially the opium or cocaine habit, if at present existing, is ample cause for rejection, as the hazard of such a risk is very great, and concealment of such a habit would be a violation of insurance etiquette, and a wrong to the company.

If cured of a previous drug habit, information similar to that required of the discontinued liquor habit should be supplied.

In dealing with *personal history*, if the record, truly given, is clear or not marred by previous degenerative disease or by existing habitual maladies, it will tend to prop up possible weak structures in family history, or compensate, to some extent, for (non-fatal) defects in some other part of the examination.

But if a history be given of typhoid or puerperal fever, of acute inflammatory rheumatism, of catarrhal pneumonia, of appendicitis, of chronic malaria, etc., contrary to the principle of civil law in which the burden of proof does not rest on the defendant, it is not the business of the medical inspector or home office to prove that some degeneration of vital organs are resulting legacies of such disease—a suspicion inseparable from such a record; but the examiner is on the stand pledged to tell the truth, the whole truth, etc., and the simple fact that Applicant Jones has had inflammatory rheumatism is not the whole truth, but answers to when, how many attacks, duration and severity of the attacks, is there an element of rheumatic heredity, and especially, is there cardiac, particularly valve degeneration, or synovial exudate—careful answers to these in a foot-note will enable the supreme medical examiner to duly estimate the bearing, if any, of such a history on the risk, and to rule with enlightened judgment.

Similar copious evidence should accompany or be a part of the report, if *any* serious disease, or other than trivial affections may mar the personal history or record.

The family history is the insurance museum, in which there is supposed to be exhibited the degree of ancestral longevity, and evidence, pro. or con., of inherited tendency to disease.

If ancestors, living or dead, have attained old age, if applicant belong to a family whose members are numerous, and

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all or most of them are alive and boast of vigorous, healthy constitutions, and the family tree is free from any blight of tuberculosis, cancer, syphilis or insanity, then this part of the report is in the highest degree satisfactory, and may overbalance adverse features in personal history, or even present condition as revealed by physical examination.

The spaces usually found in the blanks for condition of health of the living members, and cause of death, duration of last illness and previous health of the dead, should always be filled in with the best information obtainable.

It is not enough to say that the health of a living member is *poor*, or *not good*.

Stopping with this does not eliminate from the mind of the medical inspector, who may be a thousand miles removed, the possibility of phthisis, or other formidable hereditary disease in the family. The nature of the affliction or poor health should be stated.

Of the non-living members, the cause of death should be stated in every instance where it is possible to obtain the cause, also duration of last illness, for, if the cause should be obscure or indefinite, duration may tend to clear it up. A short duration usually implies acute disease capable of causing death independently of hereditary influence or of lowered vitality from chronic disease, while a long duration always raises a suspicion of either or both, so that unless the cause is definitely stated, if the duration is beyond six or eight weeks, especially if one to three years, a note should always be appended setting forth the conviction of the examiner as to presence or absence of hereditary factors.

If one parent, for instance, has died of phthisis and the other is either living and robust, or dead from ordinary acute disease and the latter's ancestors noted for health and longevity, it is important to note which parent applicant most resembles in features and physique.

If his physical make-up is a type of that of the healthy side, he is entitled to a much higher rating than if a type of the unhealthy side.

One instance of heredity in the applicant's family, will impair the value of the risk, not necessarily, though, to the de-

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gree of rejection; two impairs it more, and three still more, and so on.

Accumulated knowledge is not yet at hand, however, to determine exact or even approximate influence of heredity in the estimation of life risks.

Doctor Marsh, medical director of the Mutual Life, of New York, in a paper before a late meeting of the Association of Medical Directors, gives some experience of his company for fifteen years.

During this period there had been over 22,000 deaths in that company's risks. Of this number there were 1,994 whose records were tainted with consumption. Another set of 2,706 cases with "untainted record" was then selected for the purpose of comparison.

Each class was tabulated according to age at insurance, and cause of death. From these tables it appeared that the proportion of consumption mortality was greater by thirty per cent. among those with tainted record than among those with untainted record, and that this difference continued up to a late period of life.

The cases of tainted records were then tabulated according to the member or members of the family who had been consumptive. In a very few cases only had both parents been consumptive, and in these the experience had not been particularly unfavorable, and the same result was shown where *one* parent *plus one brother* or *sister* had thus died.

The proportion of consumption was greatest when two or more brothers or sisters had died; when one parent, or one brother or sister had been consumptive, the result was nearly equal.

He proceeded next to the consideration of personal conditions—especially the influence of body weight. The table of cases with untainted record showed nearly twice as many deaths among those below, as in those above the standard weight. And this proportion prevailed at all ages. The table of cases with tainted record showed a larger amount of consumption in both those above, and those below, the average weight; but again, there were twice as many consump-

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tive deaths in those below, as in those above, the average weight.

A series of diagrams was prepared illustrating these relative values of family history and personal conditions separately, and combined. By these it was seen plainly, that while both the history of phthisis in the family and the condition of under-weight indicated an increased liability to consumption, these factors differ considerably in the degree of their influence.

The family history exhibits much less influence than the weight, and a good record of weight over-balances tainted family history. The combination of the two factors indicates the maximum, and the absence of both, the minimum of susceptibility.

One of the most interesting contributions to this subject of heredity that has come to my notice, is the address of the president, Dr. Holden, before the seventh annual meeting of the Medical Directors' Association, held at Richmond, Virginia, a few weeks ago, his subject being, "*Defeat of Heredity.*"

From this I take the liberty to cull a few plums. He stated that we may waste and destroy an inheritance of potential vitality—that is (as implied), by vicious habits and faulty living, and evil environments. Can we, on the other hand, defeat that of a fragile constitution and tendency to disease by correct habits, by subjection to favorable hygiene and sanitation and wholesome environments?

His expressed conviction was that it is possible for any man to develop an *immunity* to ancestral disease. He alludes to the historical fact that the ancient Spartans solved the problem by a shorter process, defeating faulty inheritance by destroying all puny, feeble children, and permitting only those of robust physique and sound inheritance to live.

He by no means recommended the adoption of this plan now, but urged as milder means to the end, three essentials; First, early subjugation of the will; second, proper environment, and third, well considered marriage.

Under the first of these he says: "Few children born of licentious and depraved parents, whose natural tendency to evil has been unchecked or whose passions have been fostered

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rather than curbed, pass the period even of puberty, without an enfeeblement of vitality. This, however, is not, as would first appear, the fault of inheritance so much as the result of their own willingness to do evil. There are many of such degenerate lineage, whose defective natures will not take the stamp of virtue, yet in many, perhaps most of these, there lies dormant a spark of good which may be quenched, or by right education developed into flame. The exhibition of right motives, contact with men of noble purpose, and women of unselfish and holy lives, has moulded many a distorted character, and led it out into bodily as well as mental and moral health." In a word, this first means is embraced in correct early training and wholesome associations.

In dealing with *environment*, he speaks only of occupation, and the exposures oftentimes consequent thereto, and faulty living as a means for rapid combustion of the vital forces. For instance, he states: "The strumous child that passes his adolescence in a close office, or on the saddler's or shoemaker's or tailor's bench, makes but poor material out of which to build a lasting constitution." Also, "the young man of neurotic tendencies with insanity. or suicide in his family, overstrings his sensitive nerves in the rush and worry of Wall street, and courts his family disease."

As some findings of a labor bureau a few years ago in New Jersey, he cites that "house painters suffer from defective scaffolding as well as from lead poison. Most of these tradesmen are laid off by disease after ten or twelve years of work. It is rare to meet an old painter without evidence of disease." "Plumbers are rarely able to work at the trade thirty years. They become rheumatic, or otherwise unfit."

"Misfortune is not always to be regretted for men of impaired inheritance."

The inference from this is that they may be impelled to pursue some healthful occupation.

Other environments have their bearing, but we cannot do more than touch on this phase of the subject by submitting the above quotations; but this is enough to show that a hazardous occupation added to a tainted inheritance, makes an unsafe risk, and that bad inheritance may be defeated and its adverse

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tendency overcome by faultless environment, which includes healthful employment.

From his third means, *marriage*, I quote: "The young man of consumptive family who marries into a similar family, doubles his own chances of consumption, for, if either he or his wife fall ill with it, the other adds the wear of watching and anxiety to the recognized danger of infection." Also: "The sensitive man of neurotic and perhaps insane lineage, who finds the angel of the bridal day developing into a vixen and a shrew, is brought to face the grim fate of his ancestors." Again: "The man of iron ancestry may coolly brave, year after year, the nagging of a querulous and unreasonable woman, while the husband with an inebriate tendency, actually hails his fate sooner or later in the nepenthe of intemperance."

So, too: "Many an extravagant wife has dragged out the skeleton of her husband's family in the shape of latent criminality, or drawn him to the gambling table, to riotous dissipation, and an early ending of it all by apoplexy, or Bright's disease." These quotations suffice to show the influence of congenial, or otherwise domestic relations on the value of a life risk.

But I add another from the same author: "We can often see the relation of things best by taking extremes for comparison. Take for example a man of forty years of age, with a tuberculous or otherwise degenerate family; the party of good habits, of congenial and healthful occupation, happily married and living in a healthful locality. Compare with him, one of the same age, with a similar family record, a printer or painter by trade; a liberal user of beer, with a neglected home in a tenement district, a vixenish wife and quarrelsome children. The difference in chance of continued life in these two men is at once apparent."

While the writer from whom I have so liberally quoted has ably and logically affirmed that man *can* defeat his inheritance, his summary does not bear the fruit of practical application that the reader had, with expectant hope, anticipated. He says: "As regards life insurance, the vital question is,

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whether men *do* defeat a tainted inheritance to such an extent as to make a difference in our selection of lives.

"Of a thousand cases like the favorable one cited in the antithesis above, it is indisputable that many *will* defeat their inheritance; but so long as the uncertainties of fortune and domestic happiness and of environment continue as they are (meaning so subject to change from good to bad), and will be to the end of time, a majority will not do so, and consequently such risks on life plan at table rates would not prove desirable. They might be, however, for limited periods."

The foregoing does not imply, though, that every applicant with a tainted family record is to be rejected, but does bring out the important bearing of other factors on lives, whose records may or may not be tainted by hereditary defect. And while there may be no direct question in the blank calling for information pertaining to any of these factors—early training, environment, or domestic conditions—they are features that all examiners should take note of under the head of *moral hazard*, and are matters that are beginning to receive careful investigation at the hands of old line companies, especially when placing a large policy.

I find the subject too vast for the limit of one paper, and am forced to abridge my comments on *Physical Examination*.

Coming to this, about the first business of the examiner is to "size up" the applicant before him, by observing his temperament, the tint of his skin, the shape of his chest, and general physique, his physical carriage or movements, the sparkle of his eye, etc., all of which to an acute observer are talesmen as to degree of healthy function of the vital organs.

The relation of height to weight is a matter of no small importance. The nearer an applicant conforms to the standard weight, the better risk he is. Departure from this, either above or below, impairs the value of the risk, and in a ratio increasing as the departure from the standard increases. The adverse bearing of the underweight, especially when associated with a tainted family inheritance, has already been alluded to. The over-weight must run the gauntlet of the gouty

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diathesis, of heart, artery and kidney degeneration, with appoplexy, etc., etc., so that fat men, while they may be accepted under some conditions, as a class are undesirable risks.

If there is any marked deviation from the standard, the examiner should ascertain and state whether or not a like deviation was characteristic of his ancestors on either parental or maternal side, or both. If this is found to be true, and the ancestors attained fair longevity (and in this case the inquiry should go back beyond the parents, or if availing, beyond the grandparents), then it may have little or no adverse bearing, provided present physical condition meets the test of a rigid examination.

On the other hand, if the abnormality is *not* a physical inheritance, or if it *is*, and the limbs of the ancestral tree were short-lived, then the risk is greatly if not fatally impaired.

And, if to these should be added some present physical imperfection that is apt to be associated with underweight or obesity, then no sound company would wish to assume the risk. The examiner, I wish to emphasize, fails of his *full* duty if he neglects to include in his report all the information obtainable relative to marked deviation from the standard weight.

The tape line in *chest measurement* is valuable as an index to lung capacity, but less valuable than the spirometer, which gives capacity in cubic inches. The tape line test should be applied with care and a view of accuracy; three and one-half to four inches is a fair average expansion, but if it should fall to two and one-half, or two, or less, the test of the spirometer should be applied, and results compared before the result is forwarded to the home office.

The pulse rate, sitting posture, should not exceed the limits of 60 below and 88 above; standing posture of 60 below and about 90 above, and if the discrepancy between the postures exceed 12 or 14, cardiac weakness may reasonably be expected.

Sixteen is a good average rate for respiration; falling to 14, 12 or less, or amounting to 22 or more, casts grave sus-

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picion on the integrity of the risk, and the examiner should not forward a report containing these questionable rates without having made repeated tests and full examination, assigning cause for the same, if they persist.

Coming to *physical examination* of the vital organs, the report will possess value just in proportion to the degree of diagnostic skill of the examiner and his conscientious exercise of that skill. He should faithfully search the corridors of the structure and give interpretations of his findings as a basis for a just estimate at the hands of the medical director. If there is a valve lesion, for instance, the presence or absence of compensation is to be noted; if there is a pulmonary defect, its nature, extent and significance should be noted; if high or low specific gravity of the urine, or a trace of albumen cast suspicion on the kidneys, repeated tests to settle its temporary or persistent character should precede the sending of the report to the home office.

The same applies if reaction is found to be alkaline.

Answers to final questions constitute a summary of the report. Is the applicant a safe or unsafe insurance risk? And would you rate him as first-class, fair, average, poor or below medium?

Approximately correct answers to these call for discriminating judgment and careful estimate of all the factors.

If there is a tainted family history, even though the physical condition is perfect, a rating of first-class does not hold good.

Not alone is the draft made on the examiner's best judgment, but his honesty is brought to meet the test in the summary. The temptation arising from personal friendship, fraternal ties, professional relations or sympathetic interest born of the applicant's presence as against the company's absence becomes a ruling passion in the breasts of some vacillating or not over-scrupulous examiners, and is yielded to, I am persuaded, many times in the response of "first-class" in the rating. This is due to an underestimate of the importance of the work.

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It is only when an examiner can bring himself up to the dignity and impartial mien of a judge on the bench that he will measure up to the stature of a first rate examiner. I sometimes think the *golden rule* should be printed in a circle at the close of the blank as a reminder of the principle of *justice*, and having in the center two figures representing the applicant and the company with two distinct interests, each alike calling for justice, and each alike entitled to it.

True it is that the final rating is made by the head examiner or medical inspector, yet this functionary is entitled to the intelligent opinion of the local examiner, and, on the latter I would place the responsibility of an expressed opinion on which he would have no trepidation in facing the fire of cross-questions on the witness stand.

If his rating in a given case is low, yet in his opinion the risk is safe with some limitations, the reason for the low rating should be stated in the summary. The company or order owes whatever of success it attains to its workers in the field—to the agents largely, to the active lodge men and to examiners. At the same time it is placed at their mercy whenever integrity is lightly esteemed.

Of these three classes the agent is subjected to the greater temptation because of his contingent commission—the commission or other perquisite being contingent on the applicant's safe passage through the examining staff and his acceptance by the company, and yet one company has experimented along these lines by placing insurance on two large classes, one of which underwent examination in the usual way, the other did not, but was merely selected by the agents. After the lapse of a number of years a comparison of the records revealed a greater percentage of mortality in the examined than in the unexamined class.

What a gruesome commentary is this on the ability and integrity of that company's examining staff! And what a blot is such a record on what should be the noble name and fair fame of the medical profession!

In conclusion I would insist that the business of life insurance examining demands the study and well-nigh deserves the dignity and appellation of a *specialty* in medicine.

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MY LATEST IMPROVED BINAURAL STETHOSCOPE.

CHARLES DENISON, A. M., M. D., DENVER, COLO.

The results of experimenting with the stethoscope and the study of the laws of acoustics have led to some changes in the instrument called after my name. At the same time the competition among dealers has led to harmful cheapening of my original design, as made by Tiemann & Company, so that in some instances I cannot recognize my own child in the production I am supposed to father.

I, therefore, determined to accentuate the points proved essential, make needed corrections, and have the new moulds controlled so as to keep the instrument up to a desirable standard of excellence. With a few minor changes in the next lot to be made this desirable end will be reached.

The *large calibre* of the main tube, gradually decreasing as in deaf persons' speaking tubes down to the size appropriate for the ear ending, has been proved to be an essential feature in the correct stethoscope. As with light, so with sound, the angle of incidence and reflection are equal, and the gathered sounds are not only transmitted in the substance of which the instrument is constructed, but in the gradually concentrated column of air which the tubes contain. The even division of this transmitted sound, so that the delivery is alike to both ears, has been proved by experience to be preferable to any other method. The substances of which the parts are constructed are most important considerations, which seem to be wholly unrecognized in the long, small, soft rubber tubes which are the chief features of some cheap and handy affairs.

If steel wire is imbedded in the soft rubber of the flexible tubes, and the size of these conveyors kept moderately large, with smooth surfaces inside, the best effects are produced, as in the instrument here illustrated. This is shown by a test which is a good one for all stethoscopes, for it is really the clearness, distinctness, and naturalness of the transmission which should establish a given instrument as superior, rather than any con-

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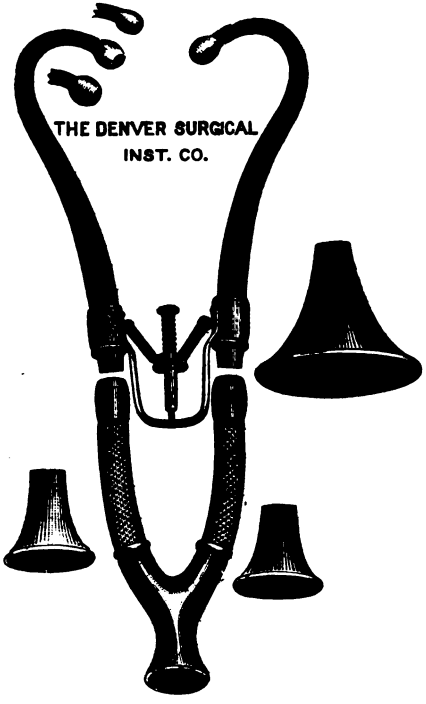
sideration of mere convenience of form for carrying, or of size as to looks.

Here is the test: Place a watch on the table and cover it with the palm of the hand, while with the other you press the bell of the stethoscope firmly on the dorsal surface. If the two bells, of instruments being compared, cannot equally be im-



bedded in the flesh so as to equally exclude outside air, then put the back of the hand on the watch and press the bells in the palm. The best effects under such conditions determine the best instrument for cardiac and lung examinations, especially the former. The conditions are very similar to those existing in the test named as to the transmission of the sound through bone and flesh combined, with this difference, that in the test given, the table-top underneath the watch gives a drum-like

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reverberation and exaggeration of the watch-ticks, which fulfills the requirements of a definite as well as a delicate test. Thus a weak ticking watch will have the movements of its machinery detected by one stethoscope of which no sound at all is audible by another. And here the fact is made evident that a proportion of listeners—and I suspect no small proportion, either—are just enough defective in hearing to have to depend almost wholly on the sound transmitting substance of which their instruments are made. To such the large sized tubes, with the imbedded steel wire coiled in the soft rubber, are great helps, while the long, soft tubes, which allow of sound transmission only through the air columns within, are of no use whatever.

Make every allowance possible for those few whose hearing may be acute enough to hear passably well with the latter, there yet remains a majority to whom the former gives clearer and more satisfactorily transmitted sounds. This sound transmission is intensified by pretty firm pressure of the ear tips into the external auditory canals, and this desired pressure is afforded in the adjustable control attached to the purposely made stiff spring between the two arms. Everyone can thus limit the amount of pressure he can stand by his own comfort. The direction of the auditory canals with reference to the side of the head is more constant than the size, and this latter variation has seemed to make it necessary to divide the ear-tips into three regular sizes, and enable physicians to have a choice. These I have made interchangeable on the uniform screw ends of the tubes. The medium-sized pair of ear ends will fit the majority, while of the remainder, more will choose the smallest than the largest size.

This, my latest invention, is found to be of great advantage. The direction of the ear ends may be varied if required by heating in hot water and binding the tubes down; but assuming that the arms of the stethoscope are usually held close to or under the sides of the jaw, the direction of the ear-tips should then be *inwards* and slightly *forward* and *upward*. This is the regular curve to which these arms are moulded.

The method of joining the tubes, and of inserting the bells in the main tube, is definitely settled as best by the insertion of slightly conical ends into the openings.

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The bell endings are four in number, and each variety has its distinct purpose. The end of the main tube is rounded out and made slightly flaring at its extreme edge to form the smallest bell, suitable for examining children's chests and for differentiating heart lesions, etc.

The ordinary sized bell is also made flaring at its border so as to give a good impinging surface against the chest wall, as thus sound transmission is aided; and the soft rubber bell is made thin and of size to project over the edge of the medium-sized bell the fourth of an inch or less, thus closing all uneven places on the chest wall in examining much emaciated persons.

Stethoscopic percussion, for which I have devised this large bell—diameter three inches—is what I make a particular point of in outlining cavities and detecting softening, and I very much wish the profession practiced it more universally than they do. It is a nice evidence of those serious states of lung tissue, often so definite and assuring in its import, that I may be excused, I hope, for describing it more minutely in this connection.

The object is to get a concussion of air in an open space in the lung, or a succussion when such a cavity is partly bathed or filled with fluid, so that the impression is conveyed along the bronchial tract and out of the patient's open mouth. Then it is caught in the large bell and conveyed to the listener's ears. Of course this must be during expiration, because then the chest wall is more relaxed and impressible, and the sounds are helped along by the outward-bound current of air. The physician sits or stands in front of the patient, while the assistant or the patient himself holds the large bell in position about an inch in front of his open mouth. Then, during long, full expirations, the examiner makes forcible or light percussion as indications require, to find deep or superficial evidence of excavation. There is a "cracked metal" and hollow sound over dry hollow spaces, and a changed succussion sound over moist cavities, which is usually quite definite, and which can be outlined on the surface of the chest—with an easy marking pencil—in a way which is very definite and gratifying. In fact, there is no diagnosis that I know of equal to it in determining the lim-

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its and size of an excavation out of sight, even as when it lies underneath a shoulder blade. In corroborative evidence of the indications furnished by other signs, and certainty of conclusions, as to the limits of lung destruction reached, there is no sign more important than this one rightly interpreted. In the estimation of advanced tuberculosis in the lungs it is very important. I speak with the more emphasis on this point, because I know I have met with many cases of softening already begun, and in others even of excavation established, which had not been previously detected, solely, I think, because this stethoscopic percussion had not been tried.

The stethoscope here presented and illustrated has given me much satisfaction, as certain defects or changes, incident to age, make me more dependent upon such an instrument. I hope you will agree with me that even if it is not exactly perfect, it is nearly so.

THE ROENTGEN RAY.

C. F. LACOMBE, DENVER, COLO.

We would say that, like most great discoveries, it has been developed step by step by various men, dating back to the great Faraday, who was professor of chemistry in the Royal Institute, in London, England, in 1833; and to his investigations, as well, is practically due the perfection of the art of dynamic electricity to-day.

Mr. Faraday suggested that the study of electric discharges at high pressure through vacua of varying degrees presented a field of great interest and utility.

His theories were taken up by Geissler, who produced a series of vacua of various kinds, which, when exposed to electric discharges, developed as characteristic colors and effects as are shown by the same gases and metals in spectroscopic examinations.

Mr. Clerk Maxwell developed, by mathematical means, the longitudinal wave theory of light, which has now been revived by Prof. Roentgen's discovery.

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Mr. Crookes advanced beyond Geissler by perfecting higher vacua until he produced the famous cathode ray, so much confounded with the X ray. This cathode ray he called radiant matter, and claimed to have discovered a fourth state of matter.

His pupil, Mr. Hertz, of Germany, developed this still further, and on his death it was taken up by his pupil, Lenard.

Curious as it may seem, Crookes, Hertz, and Lenard were all producing X rays during their many experiments. But the lucky discovery was not to be made by them. Mr. Lenard, indeed, managed to get his cathode rays out of the Crookes tube and showed that at very short distances from the ends of the tube these rays would penetrate thin films of metal, such as aluminum, etc. Mr. Lenard's last paper on the subject describing this was published in 1894, and is second only to Roentgen's in interest.

In December, 1895, Prof. Roentgen gave his celebrated lecture, announcing his discovery before the Physical Institute of Wurzburg.

It is remarkable that this is one of the few discoveries which, comparatively speaking, was brought forward completely by one man; and since Prof. Roentgen gave this discovery to the world, beyond the mere perfecting of details, no one has discovered anything original, or has combatted successfully his theory of the production of his rays.

It is stated he discovered them in this way:

His specialty was the same as Lenard's—the study of high currents of electricity through vacua and the effects of such discharges on floating dust.

In making these experiments he had a number of fluorescent screens—which we will explain later—and at one time having his Crookes tube highly excited, and at the same time covered with black paper or cloth, he noted that his screens lighted up from fluorescence. It was very easy to deduce that the light must have come from his Crookes tube, and, consequently, must have gone through the paper.

From this, a rapid course of experiments developed the fact that these rays were invisible, but at the same time went through solid matter, in all forms in varying degrees, acted on

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photographic plates like ordinary light, but could not be reflected or refracted, and were entirely distinct from the cathode rays, or the radiant matter of Crookes and Lenard.

Undoubtedly you have all read and understand the wave theory of light and sound. You know that light waves vary from the long waves at the red end of the spectrum to the very short waves at the violet end, and that at both the red end and violet end there are undoubtedly rays which we cannot see, but which are shown by their calorific and photographic effects, respectively.

These waves have always been supposed to be transverse waves; that is, they move like a wave of water. The water does not move, but the force does. The water merely goes up and down on an axis at right angles to the line of the transmitted force. These waves, as you also know, are supposed to be transmitted through the ether, ether being the name we give that unknown substance which is supposed to permeate the universe, existing not only beyond the atmosphere and extending into space, but at the same time permeating the atmosphere, and lying between the molecules of air as small bullets would lie between cannon balls were they all heaped together. It has always been supposed that this ether could only be agitated in transmitting light or sound or force in the transverse way; that is, it acted like the water in the ocean, and like water, could not be compressed.

Mr. Clerk Maxwell developed, by mathematical deduction, a logical proof that the ether could be compressed; in other words, you could transmit rays longitudinally through it. To try and explain this theory, I will ask you to imagine a line of small hollow rubber balls many feet long, with a string strung through the center. If you hit the string connecting the balls a sharp blow at one end, a wave will flow through the string to the other end, but the balls will not have moved. But if you stretch the string tight, and shove on one end of the balls so as to compress it, you will compress them all, and this operation will go from one ball to another to the end of the string; and if you remove friction, etc., it will be as strong at the end as at the beginning. This is what is termed a longi-

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tudinal wave; and if this really exists, the modern theory of light must be seriously modified.

These longitudinal waves, however, are much slower and much longer than any other ether waves of which we have knowledge, and it has been found that they will penetrate matter in various forms, much more easily than the ordinary sound or light waves.

For instance, to illustrate this, and to show that the length of the wave has considerable to do with the transmission, you will find that the low note of an organ is transmitted through a brick wall much more strongly than a high note.

This is the theory which Mr. Roentgen claims explains his X rays—that they are long, slow, penetrating rays of light, formed by the tremendous activity in the Crookes tube, and which, passing out of it at the end, transmit the same waves to the ether of the surrounding air.

A Crookes tube is a glass vessel containing a vacuum—if I may use the term—of such great exhaustion that there remains in it a very few particles of air, which, therefore, have the entire space in the tube to move in. Now, when we pass a very high current of electricity through this tube, we charge these particles of air, first, we will say, negatively at the negative end of the tube. A negatively charged particle repels one of like charge, hence these particles are thrown off the negative pole and vibrate backwards and forwards with intense rapidity. This is done at the rate of about eighty per second, and these particles thrown from the cathode pole, striking the walls of the glass, produce the fluorescence, which you will shortly see, and also the X rays at the end of the tube opposite to the cathode end.

Perhaps I should give you the more popular idea of the Crookes tube to explain the question of molecular action inside of it. Suppose you have a bottle, hermetically sealed, containing a million bullets, and that these bullets completely fill the bottle—you could shake this bottle without producing the slightest result; you would not have moved the bullets or injured the bottle. Now, suppose you take out all but ten of these bullets, and suppose you shake this bottle at the rate of eighty shakes per second—you will very speedily

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develop such a heat that you will melt the bullets and melt the glass. This is precisely the action of the Crookes tube, except that instead of bullets we have particles of air, and consequently they do not produce such an energetic action, but at the same time would, if we allowed them, melt the glass; and you will note we cool the tubes off by means of an air blast, which you will notice in the experiments which follow. We do not shake the tube, but we shake the air inside of it by alternately charging and discharging it, electrically speaking, at the rate of eighty shakes per second.

Mr. Crookes called these particles radiant matter, and found by proper appliances they could actually perform work from inside the tube; and from his theory of radiant matter has been developed the theory of molecular bombardment, which is practically another way of stating the same thing.

This theory of molecular bombardment has been developed at considerable length by Mr. Tesla, whose wonderful researches in this field have given him the greatest fame, and some of whose experiments in lighting will be shown you tonight. His theory is a popular one, and the easiest one to use in trying to explain this subject; although, in our mind, it does not work out as logically as the theory of longitudinal vibration. His theory, carried to the extremest point, is that the molecules in the tube vibrate to such a tremendous extent that they are actually thrown through the glass into the surrounding air through the subject to the photographic plate, and there produce a photograph by making the plate fluorescent; in other words, light up of itself.

It is borne out apparently by the fact that fluorescence of the photographic plate has received many supporters, and does not seem at all unlikely; but may be produced by waves, not molecules. It is probably incorrect.

The definition of the term fluorescence is that quality possessed by some minerals of absorbing one kind of light and giving out another. You have all noticed in clear glass the bluish light of some kinds and the greenish light of another—that is fluorescence.

Phosphorescence, which is often confounded with it, is that quality of giving out light some time after the source from which it is derived is shut off.

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Fluorescence is used in these experiments, then, to absorb the invisible rays of Roentgen and give the pale white light, which you will see a little later. We will also show you with the tube the difference between cathode light and the Roentgen ray.

The cathode light practically does not come out of the tube, and acts more like ordinary light than the X rays. It can be deflected by a magnet, and probably slightly concentrated by one; the X rays cannot. The cathode rays do not photograph; the X rays do.

As a Crookes tube is exhausted it passes through various gradations of vacuum until it produces one in which there is a dark space around the negative poles. As the vacuum is carried higher and higher this dark space increases until it fills the entire tube. Mr. Crookes describes this dark space as the amount of room through which the molecules of air remaining in the tube can travel before they hit another one; in other words, it is called the free path, and you will see it appear in all good tubes when they are first used. Later, as the vacuum increases, it disappears.

SOURCE OF RAYS.

After various examinations nearly all the experimenters with the X rays have found that the rays proceed from the outside of the glass, at the end directly opposite the cathode pole.

We have confirmed this by surrounding a Crookes tube with photographic plates on which were placed articles which would throw a strong, sharp shadow in the direction from which the rays come. These shadows all pointed directly at this spot. This test has also been made at Columbia College, and several other institutions, so that, practically, there is no doubt now as to the point of origin of the rays. They flow in all directions from this point, though, coming back through the tube, through the glass and out at the end.

DESCRIPTION OF APPARATUS.

To produce the X rays it is necessary to have strong apparatus of the very best make, so as to obtain a very intense current, and, at the same time, be able to withstand its effects.

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We produce the current by means of an induction coil, to which current is supplied by the dynamos in the basement. This induction coil, as you will see by the drawing, consists of a number of turns of large wire wrapped around a soft iron core, and then it is wrapped with thousands of turns of a very fine wire. This particular coil, which we made ourselves, contains nineteen miles of a small wire, called secondary, and has 91,000 turns. It resembles in its action the ordinary converter by which the alternating current is changed from 1,000 volts to 50 volts, and so can be used safely in our houses. It is built on the principle that if a current of a certain strength is passed through wire of a certain size with a certain number of turns it will induce in another wire wrapped around it another current which will have the same relation to the original current as the size of the secondary wire and its turns bears to the primary wire and its turns. The conversion here is from 110 volts to 500,000 volts.

This induction coil is charged through what we call an interrupter. This interrupter is simply a commutator run by a motor which makes and breaks contact very rapidly. This acts on the continuous 110-volt current in this way: It alternately holds it back and lets it out, just as water would act in a hose through which it was passing if you kept turning the nozzle off and on very rapidly. This makes what we call a pulsating current. This pulsating current is also conveyed through a condenser which is in the box underneath the coil, and which alternately charges and discharges itself in synchronism with the coil and aids it in producing a long strong spark. We can produce, with this coil, a spark of twelve inches, which would represent probably way over 1,000,000 volts pressure; but it strains it very much, and we ordinarily use only a six-inch spark.

We will now begin our experiments by showing you the action of a current of electricity flowing through different kinds of vacua.

First, we would say we have a number of kinds of tubes, called Geissler tubes, in which the air has only been partially exhausted, or in which we have substituted other gases. You will see in them the characteristic colors and striations.

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We will also show you Mr. Tesla's experiment, which shows even more characteristic effects than these tubes.

The various Geissler and Crookes tubes which we have will be shown you, and you will then perceive the action.

The tube we will now show you was given us by Prof. Rowe, of Boulder University, and came from Germany. It was, however, poorly designed, the leading-in wires being too small to carry the current, and it has consequently leaked a little air, but produces a beautiful color effect, the violet-reddish light in the center being due to the air which has leaked in, and the flickering greenish light on the upper part shows the fluorescence, some of which still remains.

The tube we will now show you is the veteran of the lot. With this we perfected all our details and took many of our most successful photographs. We strained it shamefully, but it is still in good order, and we are keeping it as a relay in case our new one breaks down.

This tube is the last one we have received, and gives a most beautiful fluorescence, and by perfecting with it every detail of the process, we are able to take the most perfect photographs.

I would like to explain that between the induction coil, the tube, and the wires leading to it and around them for quite a distance, exists what is known as a very high electric field. This field may be produced in various ways—by a friction machine, by this method, and by Mr. Tesla's method, which consists in taking the current direct from a specially designed dynamo.

Mr. Tesla would take these wires, insulate them carefully, and run them around the walls of this room; of course his field would be much stronger than anything we can obtain here, and, curious as it may seem, still more safe.

While we can get a very sharp shock from the current we are using here, at the same time, I can take hold of the wires and let the current pass through me without being at all disturbed; in fact, I can barely feel the current. By disconnecting these wires in the Crookes tube, taking a lamp into my hand and taking hold of one end of the wires you will see that the lamp lights up with a very pale blue light. When I bring

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it near the other wire, or, in other words, near a more intense portion of the field, you will see it lights up with quite a strong light. Now, you will notice I am not holding onto anything, and have no connection with the apparatus whatever, but the lamp is still lighted.

This is due, according to Mr. Tesla's theory, to a high inductive field making the molecules remaining in the lamp vibrate to such an extent that they hit each other and light up. There are enough molecules left in the lamp, however, to give a rather small free path, so that they do not go far, relatively speaking, before hitting another one.

This process perfected in a commercial way, so that we would get a brilliancy equal to the ordinary incandescent lamp, is one of the things upon which Mr. Tesla is now working.

Dr. Hershey and Mr. Haffner will now show you a series of pictures of some thirty lantern slides which we have taken, partly, for this lecture. We have taken a great deal of pains with them, and I feel safe in saying that, so far as I know, it is the best collection which exists west of New York; and there is one to which we will particularly draw your attention later.

While Dr. Hershey and Mr. Haffner are exhibiting these lantern slides, if any one in the audience has any peculiarity in his hand, of which he is sure we do not know, we shall be glad to take it at once. We say the hand, for the simple reason that we can take it very quickly, and it will not be hard on the subject; but you can see by the lantern slides that we are not at all limited as to the portions of the anatomy we can take.

We are particularly proud of the slide we are now going to show you. The last slide which Mr. Haffner threw on the screen we call the X ray quartette, and we will ask him to throw it on again. Here you can see the tube very clearly, with the induction coil combined, Mr. Johnson looking at it through the fluoroscope to see if it is working properly, Mr. Swank working the air-pump, and myself endeavoring to control the fluorescence and throw the stream of air. Mr. Haffner is lying on a platform with the plate under his chest. After a long exposure this plate was taken away, and we now

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have the pleasure of showing you a slide which has only been duplicated to date in London and New York. This is a photograph of a man's ribs, spinal column, shoulder blades, etc. I think the doctors in the audience have rather had the idea that we were limited to the extremities merely. We have now perfected the apparatus so we can photograph the bones in all parts of the body.

Mr. Haffner will now throw this slide on a screen, and we will show you that we can find bullets in the chest as easily as anywhere else; in fact, you will see a dark spot on one side, which was a piece of silver laid on his chest—the hardest position in which to photograph it. I will ask Dr. Hershey to describe to you what these various bones are, and to dilate, perhaps, on the field which he now sees opening before him.

We will now endeavor to show you the fluorescent screen. By means of this screen in a pasteboard box called a fluoroscope, with our small tube, we have been able to see and distinguish through the chest of a full-grown man. With it we could locate a bullet in any part of the extremities, and practically in any part of the body. We are not able to show it to you as distinctly as that, as you are too far away; but here we have a box in which we have placed the Crookes tube, and at one end on the outside you will see an object which appears to be a piece of white paper. This paper is covered with very minute crystals of tungstate of lime. On the other side of the piece of wood which holds this paper is fastened a large iron washer. When we turn the current on you will see the shadow of the washer thrown on the paper through the wood. Those nearest to us will see it more distinctly than those far away; but we trust you will be able to get an idea of it, as it would be almost impossible to show it to all of you in detail.

It is on the perfection of this method that we rely to bring out the full utility of Prof. Roentgen's discovery, and I have no doubt that in the near future we will be able to differentiate the organs of the body and locate certain diseases.

We must thank you now for your kind attention, and we trust we have succeeded in interesting you in this lecture. We can say for it, that, so far as we know, we have now shown you the entire process of the art up to date, and we trust you

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will appreciate the great discovery which was made by that pure scientist in Germany, who gave it to the world some three months ago, merely for the sake of advancing science.

DISCUSSION.

Dr. P. J. McHugh—In the British Medical Journal for March, 1896, appeared a skiagraph of a foot showing an extra bone in the great toe, and also one showing a deformity of the leg as the result of an improperly set fracture.

In the American Journal of Medical Science, March last, appeared a skiagraph showing two buckshot and a piece of glass embedded in the tissue of a dead hand, and a skiagraph of a baby's head, showing two buckshot placed under the skull.

In Anthony's Photographic Journal, a skiagraph showing piece of glass and a pin in the tissue of live hand.

These, and many other shadowgraphs that might be clipped from journals and magazines of repute, as well as the splendid exhibition witnessed to-night, show the progress that is being made in X ray photography, and also indicate the value of the ray in surgery.

The action of the ray on the various tissues of the body presents a great variety of effect, as may be seen by the shadowgraphs alluded to. The softer tissues of the body, as muscle and fat, are easily traversed by the ray, and hence cast a very light shadow; the tendons being denser than the muscle, cast a heavier shadow; the bones being very dense, cast a shadow much more dense than either of the former, and can be seen in perfect form and outline.

In surgery, the fluoroscope may be utilized for examinations. The instrument was named by Edison, but invented by Salvioni. It consists of a conical box with a blackened interior. The bottom of the box may be of cardboard, wood, or cloth, and should be blackened. On the inside of bottom is placed a layer of some fluorescent substance, and the hand or part to be examined is placed between the excited Crookes tube and the fluoroscope. An indistinct outline of the bones may be seen. The higher perfection of this instrument will add much to the practical utility in surgery of the X rays.

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Where the muscles are not too thick, dislocations, fractures, or deformities may be observed and diagrammed with great facility. If his means permit, the apparatus will be of great assistance to the young physician, and save him much worry and annoyance. When I began practicing I should like to have had an X ray outfit. It would have saved me a great many restless and uneasy nights to get a shadowgraph of my fractured cases after the bandage had been applied and for some days afterwards.

As a means of diagnosis in some cases it will be of much benefit to all. Any of us are liable to meet cases that are hard to diagnose. I remember well when I was an interne in Harper Hospital, Detroit, Michigan, of assisting Dr. McGraw in cutting down on a shoulder and finding an ununited fracture of the surgical neck of the humerus; a celebrated surgeon in New York city some years before had diagnosed it as a dislocation. In the British Medical Journal of March 6, we find that Mr. Gray utilized the X rays to diagnose an obscure case of dislocation of the elbow joint. The fact that bandages and splints (except plaster of paris) are permeable to the ray offers a great advantage, as we may be able to observe the callus that is thrown out and the condition of the bone until hardening takes place without removing the bandages.

The X ray will do much to secure harmonious equipoise among physicians. Too often we are called upon to give an opinion on a broken or dislocated bone that was improperly treated by some fellow practitioner. There should be no such mistakes with the X ray as a guide. The traveling osteopath, so called, will suffer as a result of the discovery, since the falsity of his assertions can be laid bare by the searching light of the X ray.

Bony tumors on the extremities will not escape our observation, and the presence of necrotic processes in bones has been demonstrated by it.

The present advancement in X ray photography, so far as I have been able to learn, does not enable us to photograph abnormal conditions of the internal organs on account of the thickness of the body; neither can we photograph objects inside of bony enclosures like the pelvis, thorax, or skull, except in the

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case of very young children where the bony wall is very thin, and the object to be photographed is very dense.

With the higher perfection of the means to utilize the ray will come, I predict, the detection of stone in the kidneys and ureters. Stone in the bladder will not be photographed, because of the pelvic bones obstructing the ray. Gall stones being composed of cholesterine are permeable to the ray, hence cannot be photographed.

Opaque foreign bodies in the alimentary canal may be watched in their course, and, should indications demand operative interference, can be readily located and extracted.

British scientists recently report success in exposing the air passages with the crytoscope. It was found possible to discover a substance lodged in the trachea, and to follow the movement of an instrument inserted for the purpose of its removal. Not the least of all the important uses of the ray may be the photographing of the foetus in utero and diagnosing its position therein. With such successful results of the ray, the mortality in pregnancy will be reduced still lower, and the Roentgen discovery in this regard will stand only second to the Lister discovery for the successful treatment of obstetrical cases. It will also be a potent means for diagnosing pregnancy from fibroid or phantom tumors, or other conditions that simulate pregnancy. Should such a thing become possible it certainly will be practicable, as it may be carried on with the intended mother well covered in bed, the clothing offering no obstacle to the ray.

The aid that we shall receive through the ray in detecting foreign bodies in the tisue is alone a great aid to the surgeon. It is unfortunate that the interior of the eye cannot be examined for foreign bodies on account of the dense sclerotic tissue being opaque to the ray.

Myositis ossificans progressiva will be readily diagnosed by it.

The experiments of Drs. Pratt and Weightman indicate that the ray will render inactive the diphtheria and typhoid bacillus, and that there is a destructive effect on all forms of bacteria, the theory being that the ray releases oxygen and thus by chemical combination creates a deadly acid. Delipene,

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Park and others claim that the bacteria cultures after an exposure of an hour were not destroyed but possibly were more vigorous than before. I hope that the discussion by those who follow me will show the true effect, if any, of the X ray on bacteria.

Dr. Leonard Freeman—There is one thing about the X rays which I think we can all appreciate this hot evening—they give out absolutely no heat.

I wish to sincerely thank, for myself, and, I am sure, for all the members of the medical profession of Colorado, the gentlemen who have worked so industriously to bring the methods of utilizing the Roentgen ray to such a state of perfection in the West. These gentlemen are Mr. Lacombe, Mr. Haffner, Mr. Johnson, and their assistants. I think I am justified in saying that there is no better work done in the world than is done right here in Denver, of which you have seen a demonstration this evening. The negatives, however, as I am in a position to know, show details much more clearly than the lantern slides as thrown on the screen. These men have given time, considerable money, and great energy to this work, and they have received no compensation except the compensation which every scientist receives in doing that which he knows to be of benefit to his fellow-men.

It has been a pleasure to me to see the anxiety with which the taking and development of these photographs have been watched. When one of the Crookes tubes broke, for instance, it was almost like the death knell of a friend. Mr. Haffner, I remember, told me of his experience in the dark-room of his laboratory. He was developing the first picture—a picture of a hand. As the skeleton fingers came gradually forth from the blank plate, he felt a sort of creepy sensation, as though it was some ghostly hand beckoning to him from another world—and it was another world; a new scientific world. We can thoroughly appreciate his feelings on such an occasion.

As far as the scientific aspect of the subject is concerned, this is scarcely the place for its discussion. The X rays will undoubtedly be of great benefit to surgery in fractures, dislocations, the location of foreign substances, and in many other ways which we do not perhaps at present fully appreciate.

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Nevertheless, there are limitations—great limitations. We cannot discover all foreign bodies—splinters of wood and pieces of cloth carried in by bullets, for instance, are invisible, and these things are often of the greatest importance. Again, it is difficult to locate the exact position of a bullet, say in the chest, unless the rays are passed through the bed in two directions, which may be difficult, although the fact that the closer the object lies to the sensitive plate the sharper the outline of the picture, may be of some aid. A difference of half an inch, however, might make much difference in the operation.

An interesting question, to which attention has been little called, is the use of the Roentgen rays in the tuberculosis of bones and joints. The disease is often distributed in small foci, particularly in the ends of the long bones, which it is perhaps possible to locate, and thus avoid overlooking them in an operation.

The rays are particularly important in fractures of the wrist, not only in telling whether there is a fracture—and that is sometimes very difficult—but also in deciding what is the best method of reduction, and in telling when reduction has been accomplished. Fractures of the wrist are among the most embarrassing things which a physician has to treat, and any discovery which aids him is of the greatest importance. If the X rays had accomplished no more than this, they would be a boon to humanity.

Dr. Geo W. Miel—In its relation to surgery the X ray is destined to have a wide range of utility. To-day its greatest application is, first, in locating foreign bodies which have invaded the human body, particularly for the purpose of their removal. Its next most useful application to surgery is in the light it throws upon fractures.

I shall confine myself in this discussion to the consideration of the first of these two important functions.

Foreign bodies—with the exception of wood—which most commonly invade the human body are fortunately opaque to these penetrating rays. They comprise lead, iron or steel, glass, and I think coal.

Roughly speaking, the human body has two complete envelopes. The outer—or jacket—formed of the skin and super-

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ficial fat, termed the integument, offering only moderate resistance to the penetration of foreign bodies; the inner giving the muscles in their separate coverings a sheath, and formed of tough membranous fibre, termed the deep fascia—the two envelopes being loosely attached by connective tissue.

A lost foreign body simply invading the outer envelope, though it shift about, assisted by gravity and motion, needs no consideration so far as the X ray is concerned. When, however, it penetrates the second or tough envelope and remains more or less fixed, or moves about among the muscles, its removal may be necessary, and in any case is commonly advisable. Among these bodies are those comfortably tolerated, as unchanged missiles; those tolerated and sometimes irritating, as a roughened or somewhat deformed bullet, needles or fragments of needles—sometimes glass; and those which are irritative—deformed and roughened bullets or other missiles, fragments of metal, glass, coal, etc.

The removal of irritative foreign bodies is particularly desirable where practicable. Conditions guide us in this matter, and our better surgery of recent years has greatly lessened risks. Foreign bodies in the neighborhood of articulations, or in the immediate vicinity of important vessels make their removal especially to be sought.

In the removal of foreign bodies the probe in intelligent hands has served good purpose. To use it without first eliciting the history of the case, regarding principally the position of the individual with relation to his invasion by foreign substance, or to destroy the track by forcing it through the tissues instead of letting it find its way, is an abuse in the largest sense.

A recent innovation—the telephone probe, an admirably contrived model having been exhibited by Dr. C. B. Lyman in this society meeting—marks a large advance in the matter of locating metallic foreign bodies, and forms a formidable competitor with the X ray. It is conveniently portable, always ready for use, and inexpensive.

Usually a missile striking a bone which bends, or presents marked convexity, and especially if the missile comes at a strong slant, is apt to deflect and take an irregular course; the

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same is true if it strikes a tendon; range and force with which it is impelled, and material and manufacture have relation to such deflection.

The small, hard content bullet now used in the new military rifle (Krag-Torgensen) was expected to be humane, and was designed to wound rather than kill. Propelled with great force, this manner of ball was expected to make clean wounds and maintain its form. Recent official tests prove it cruel; its explosive quality at 1,000 yards being terrific.

In the majority of pistol and gunshot wounds the ball, though likely deformed, remains entire; it is, as well, not necessarily lost. Under these circumstances, aided by proper calculation, the telephone bullet probe in most cases will reveal it. When the bullet is truly lost, or when fragmentation has occurred, the X ray is our resource, and its proper employment may clear the matter up.

Though at present the X ray gives no information within the cavity of the skull, the telephone bullet probe largely fills this want. It seems probable that we shall eventually be able to get a good shadowgraph of the spinal column, which would be of inestimable value; with reference particularly to instances similar to that which caused the death of Garfield.

The X ray will have its greatest application in time of war. It will be the means of saving many lives, lessen complications, and quicken recovery.

Dr. Edmund Rogers—The intense heat practically forbids much discussion, and the whole subject has been very fully covered in the interesting demonstration. The Roentgen rays will be of eminent use in surgery—that goes without saying. They have already been of great benefit to the surgeons here in Denver, and used in a great many cases, especially in those where some metallic substance, as a bullet, has been lodged in the tissues; a bullet in the chest is a case marked and to the point. To me, however, this demonstration is infinitely of more interest in what it suggests than in what it demonstrates. It shows us that physical science is a great deal more extensive than we have believed it to be. Our senses are only limited in their capacity. If any one had gotten up in this room a year ago, at this meeting, and talked of the possibility of such a

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thing as we have seen to-night, he would have been laughed at. What will the next year show—the next ten years, the next one hundred years? Things that now are beyond our comprehension, beyond our realization, beyond our reach, will be brought within touch of our physical senses. This, to me, is the great practical point of the X rays. Not what they have already achieved, but what will be achieved in the future. There are an immense number of points for discussion, and all of the practical points of its application to surgery will be more or less discussed; but nothing more can be said, really, than what has been already demonstrated.

OPERATION FOR FIBRO CYSTIC TUMOR.

E. A. LEE, M. D., FORT COLLINS, COLO.

The rarity of the following case serves as a sufficient apology for reporting it to this society.

May 10, 1894, I was called to attend A. F. H., male, aged 76 years, living one mile east of Fort Collins. Found patient suffering from a moderate attack of la grippe, which, owing to his age and rather feeble condition, was affecting him much more severely than would be expected under ordinary conditions.

Before leaving the house the patient requested me to examine an enlargement which he had accidently discovered in the upper part of the right iliac region, about one and a half inches to the right of median line, and an equal distance below the level of the anterior superior spine.

Its position being, I think, far back in the pelvis, palpitation revealed a mass of oval outline, about three and one-half by four and one-half inches in diameter, of rather firm consistency, inelastic, not presenting any well defined doughy sensation, only slightly sensitive to pressure, and not painful. Owing to its deep seated location, and since it was still more obscured

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by being covered by and lying behind the intestines, its character and origin were so concealed as to render diagnosis both difficult and uncertain. Yet I had the impression that it was probably produced by faecal impaction.

I was called again August 12, 1894, when a perceptible increase in size of mass was noticed, the tumor being at this time nearly an inch larger in diameter, and the condition attended with alternate constipation and diarrhœa. The mass of fæcal matter was nearly uniformly kidney shaped and about the size of a lima bean. During the attacks of diarrhoea, large quantities of a semi-liquid, gelatinous, almost transparent mucus were passed involuntarily from the bowels.

From this time the increase in the size of the mass was continuous; it extended over to the left side, and fluctuation could be perceived. This in a great measure cleared up the diagnosis, determining it to be a tumor more or less cystic in character. Not infrequently there would be periods of two or three days, or longer, when pain and soreness were well defined, causing loss of sleep, and demanding anodynes for relief. The very advanced age of the patient, and his great reluctance to submit to an operation, together with the little assurance of relief given by his medical attendant, induced him to defer surgical interference as long as his condition was consistent with even a moderate degree of comfort. Thus matters were permitted to drift along until December 24, 1895, when the tumor had increased much in size, and the distressing dyspnoea was so urgent that, as the patient expressed it, it was either submit to an operation or choke to death.

An exploratory incision was now made, and a large mass covered with peritoneum, the sigmoid flexure, and part of the rectum found presenting at the wound. The mass was firmly fixed and could be felt extending into the pelvis and attached to the posterior wall. An aspirator was introduced and a thick gelatinous substance obtained. The exposed surface of the tumor to the extent of two inches was drawn to the opening, and the edges of the wound were firmly united to the surface of the tumor and stitched with silk, leaving a portion of the tumor exposed. At the end of five days the tumor was

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incised and seven pounds of the contents scooped out. At this time a uterine probe could be passed through the whole length into the cavity. The dyspnoea disappeared, and the patient rested better than for months. The action of the bowels became regular soon after. Later on about five pounds of the contents were evacuated. During three weeks following the operation the patient improved, until at the end of that time he was able to sit up and converse with his friends; but evidence of failure of the vital powers began to be apparent, gradually increasing until January 16 when he died.

At the autopsy the wound was found in good condition, with the adhesions between the anterior abdominal wall and tumor sac perfect, and no evidence of inflammation in the peritoneal cavity. Lining the sac were numerous calcarious plates from degeneration, and the sac walls, one-half inch in thickness, were of dense fibrous tissue. The tumor was attached to the anterior middle portion of the sacrum, and had developed beneath the peritoneum, unfolding it, and carrying above it the large and small intestines. It had begun as a fibroma from the sub-peritoneal connective tissue covering the sacrum, and had later undergone cystic and calcarious degeneration. By its pressure it had obstructed one of the ureters, until the latter was sacculated and one inch in diameter. Both kidneys were found cystic and less than one-half natural size. The pressure on the rectum, together with the stretching, had kept up the mucous colitis which disappeared when the pressure was removed.

The case is of interest, first, because of the location of the tumor and its long history; and second, because of the operation done in two stages, thus relieving the symptoms and reducing the dangers of sepsis to a minimum; and it was the consensus of opinion of all who were conversant with the progress of the case, that had the patient not had his vitality so greatly lowered by advanced age, his chances of recovery would have been at least fairly good.

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SACCULATED INNOMINATE ANEURISM TREATED BY THE INTRODUCTION OF GOLD WIRE AND GALVANISM.

E. P. HERSHEY, C. E., M. D., DENVER, COLO.

The departure from the routine method of any operative procedure has for its greatest drawback conclusions drawn from a too early report of its efficacy. For the treatment of aneurisms various methods have been recommended, several of which have apparently been followed by good results, but the history has seldom been followed up for a time sufficiently long to acquaint us with the future results of the operation. It is for this reason that even at this date, six months after the operation, it is with some misgivings that this case is presented to the medical profession, although sufficient time has elapsed in which to prove that, at the very least, some result has been obtained in the relief and comfort of the patient, and that, too, as the history will show, after all so-called curative and palliative measures had been resorted to. We all know that when an aneurism has assumed such proportions as to cause decided bulging of the chest, the patient becoming exhausted upon the least exertion, and finally from sheer weakness being compelled to keep his bed, we can soon look for a fatal result. Then, too, after concluding from careful observation that those remedies, which have found favor among the profession, have been without result, any simple operative means that will enable the patient again to resume his work, and be still at it at the end of nine months, should be resorted to before any of the more hazardous operative procedures be even entertained. It is for this reason, and this reason alone, that the history of this case is presented to you in detail; and if the future should prove that the operation is not a successful one, there could be no reason why some of the other methods should not be tried.

For a year and a half previous to the time I saw the patient as consultant with Dr. Place, the patient had been suffering from a deep-seated pain in the chest, described by him as being beneath and a little to the right of the upper part of the sternum. The patient had been treated for various affections,

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principally for rheumatism. This pain was accompanied by more or less oppression in breathing, which always became aggravated upon exertion. In the early part of January, 1895, a slight bulging of the chest was noticed, gradually increasing until the following May, when a decided pulsating tumor was found, most prominent between the second and third ribs, about two inches and a half to the right of the median line. The case at this time was diagnosed by Dr. Place as aneurism. The latter part of July this diagnosis was confirmed by Dr. T. H. Hawkins and myself, at which time the following treatment was agreed upon: As near complete rest in bed as possible, Valsalva's method of diet, and barium chloride, gr. 1-4, increased to gr. 3-4, three times a day. At the end of seven weeks the symptoms were all exaggerated, and the patient being familiar with his critical condition desired the introduction of the gold wire into the aneurismal sac, to be immediately followed by galvanism; this method having been urged upon him when it was ascertained that no favorable results were being obtained from the last treatment.

Fourteen karat gold was drawn out to No. 28 gauge by Wagner, the jeweler, who conceived the very happy idea of snarling the wire, so that after it had been passed through the needle it would bunch itself rather than coil, as was first intended. With the proper spring it was wrapped about a glass vial and placed in a clear carbolic solution ready for use. The needle that was used was one of the large sized hypodermatic needles with a calibre for about a No. 22 gauge. This needle was prepared by Dr. E. R. Warner, who accomplished complete insulation by layer after layer of the varnish of gum shellac, each layer set in its turn by heat. A thirty-celled galvanic battery furnished the current which was passed through a McIntosh milliamperemeter.

On the 29th day of August, 1895, the patient was prepared for the operation. The skin over the tumor was cleansed antiseptically. The insulated needle was thrust into the sac, the blood spurting through the needle to a considerable height. This, however, was immediately controlled by the wire (it having been previously washed), which was rapidly passed through the needle. The intention was to fill the cavity with the wire,

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it having been previously estimated to take at least ten feet. A fault in the wire after two feet and a half had been passed caused it to kink, which prevented any further passage of the wire. The wire was cut about three inches from the needle and attached to the positive pole of the battery, the negative pole having for its electrode a flat, wet sponge covering an iron plate six by eight inches, and kept in contact with the skin of the back, directly opposite the aneurism. Considerable uneasiness was experienced by the patient at first, but as the current passed he became reconciled and was content to bear the pain of the negative electrode. By increasing slowly the number of cells, Dr. Lyman Ellis, who controlled the battery, kept the indicator at 70 milliamperes. With everything ready, the needle, which stuck out fully three-quarters of an inch, at once became a guide as to the results to be attained; its rhythmical motion, swinging latterly like a pendulum and with each pulsation of the heart springing upwards, during full three-quarters of an hour, never varied the slightest, indicating little or no change in the contents of the sac. Simultaneous with a change in the rhythmical motion of the needle came the warning from Dr. Ellis that but 60 milliamperes were indicated. As the motion of the needle became less and less marked, the resistance became greater; lower and lower became the number of milliamperes, until finally 40 were indicated at the end of one hour and five minutes, when the motion of the needle was barely perceptible, and, instead of the soft, full, pulsating mass characteristic of an aneurism, was felt a hard resisting tumor much smaller, which told the story of the only change that could have taken place—the formation of a blood clot.

Now arose the most difficult part of the operation—the removal of the needle. What little blood had flowed into the needle about the wire had become decomposed and formed into hard, dry fibrous tissue, acting as a cement. The wire bunched within the sac and completely enveloped within the blod clot resisted tension. By continued manipulation of the needle it soon yielded to the force exerted, and the wire and needle came slowly out. Pressure was made around the point of exit and the wire cut close to the skin. The tension being off, the wire

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slipped out of sight, the whole mass having evidently sufficient spring to draw the end completely within the sac.

Careful examination of the tumor an hour later developed at the extreme right portion some softness, as of a liquid confined to a small space. This was evidently blood serum confined to the upper and outer portion of the sac. All signs of this, however, had disappeared in a few hours. Upon auscultation no murmur could be detected. The temperature rose that evening to 99 4-5°, the following evening to 100°, and after that the thermometer never indicated at any time a temperature to exceed 99°. That night the patient, for the first time in seven weeks, was able to sleep while lying on his back. During the following month of September, the improvement in the patient's condition was marked. In October he returned to his work. In the latter part of December I presented the patient to the students of the various colleges who had assembled at the County Hospital. At this time his general appearance was excellent; he had gained in weight, and felt no inconvenience from the tumor within the chest, excepting occasionally he had pain in that region resembling neuralgia, but this was not constant. The tumor had somewhat contracted, but not to the degree as had been hoped for.

At the time of this writing (March 20, 1896), six and one-half months after the operation, the symptoms are about the same as they were during the latter part of December. The presence of the wire may have considerable to do with the pains in the chest. The symptoms of aneurism have all subsided, and the patient remains to be closely watched for future developments.*

It would be useless to occupy your attention by enumerating the different drugs used in the early treatment of this disease. Suffice it to say, that one by one they were laid aside, while the aneurism continued to increase, and day by day the case was closely watched with the expectation of the usual termination of these cases. To open up a discussion as to the merits of the operation would be more interesting, and cer-

*Letter received from California states, all neuralgic pains gone. "Electrolysis produced in his case beneficial, and, so far as we can judge from observation, permanent results."

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tainly fruitful of better results than to rehash the old story of therapy in the treatment of aneurism.

Discussion as to the solidification of the contents of an aneurismal sac has led to two beliefs—on the one hand, that it is an actual clot formation; on the other, the formation of plastic fibrous tissue poured out by the sac wall. In the case just related there is scarcely any necessity for discussion. No matter how greatly the wire and electricity may have irritated the sac wall and started up inflammatory action, it is beyond all experience to find as a result the formation of solid fibrous tissue in so short a time. This may possibly be nature's method of bringing about a cure, but it certainly was not so in this case. The condition of the canals of the needle would show this without a doubt. Then, too, although results in the past with the use of electro puncture were poor, post mortem examination always revealed clotting to a more or less extent.

The simple introduction of wire into the sac, as first tried by Moore, of London, the purpose being to whip the blood into a clot, met with no success; but then, taking into consideration the fact that twenty-five feet of wire were inserted, and antiseptic methods at that time were not carried out, we could hardly look for any good results. Later on, horse-hair was used by Levis, and still later on, Schrötter, of Vienna, used Florence silk with the same ungratifying results.

The method suggested and tried recently by McEwen should be promising, but when we take into consideration the hazardous method, we are apt to hesitate and look for one more easily carried out, and fraught with less danger. McEwen's method is to effectually scratch the inner wall of the aneurism; thus set up inflammatory action, and thereby strengthen the walls of the aneurism. This delicate manœuvering within the sac, knowing that the wall is at times so frail that little force is necessary to penetrate it, must take, indeed, a bold operator to risk such a procedure.

There have been in all ten cases reported upon this combined method of treating aneurism, counting the one now under consideration.

Burresi's case—Aneurism of ascending part of aorta; current for twenty-five minutes; seventeen inches of No. 30 wire

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used; operation well borne; pain entirely gone at the end of three days; formation of firm clot. Death at end of three and one-fourth months. Electrical current tested by a voltmeter to yield 1 c. c. of hydrogen gas for the first minute.

Barwell's case—Large aneurism of ascending and transverse part of aorta; ten feet finest steel wire passed into one division of the sac; ten milliamperes for one and one-sixth hours; signs of consolidation at the end of six hours. On fourth day rapid increase of secondary sac. Death on the seventh day. Necropsy showed primary sac contained much thick, firm, decolorized fibrin closely united to sac and wire.

Roosevelt's case—"Aggravated aortic aneurism, threatening death," involving four ribs on the right of the sternum; 225 feet fine steel piano wire; twenty-five milliamperes passed for one-half hour; less pulsation the second day; seventh day better condition than previous to operation. Death on the twenty-third day.

Abbe's case—"Rapidly advancing aneurism at root of neck;" 100 feet No. 1 aseptic catgut passed into sac; one part of tumor seemed firmer, but rapid advancement in other part. Ninth day thereafter 150 feet fine sterilized wire were passed through insulated aspirator needle; one-half hour fifty milliamperes, anode the active pole, followed by 100 milliamperes for one hour, current reversed, cathode the active pole; pulsation continued; tumor wall firmer; ruptured on second day.

Kerr's case—Fusiform aneurism from base of heart to origin of left subclavian artery; six feet silver wire; current passed fifty minutes; strength not given; pain and pulsation greatly relieved. Death on eighteenth day. Necropsy showed firm clot had formed about the wire as well as on sac wall.

Kerr's case—"Aortic intra-pericardial aneurism." Electrolysis tried; no success. Electrolysis through introduced wire; ten feet drawn silver wire; current one-half hour; strength not given. Patient lost sight of one year later. No symptoms up to this time. Patient stated he "was feeling as well as ever." This case considered a cure.

Cases cited and bibliography mainly dependent on article upon this subject by D. D. Stewart, American Journal Medical Sciences, October, 1892.

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Rosenstein's case—Aneurism ascending part of arch; galvano-puncture tried twice; first, single needle, seventy milliamperes, twenty minutes; second, thirteen days later, repeated with two needles—no beneficial results; five and a half weeks later, two and one-sixth feet were introduced; wire pushed entirely into sac; current applied thirty minutes; presumably seventy milliamperes, as above, though not stated; pulsation disappeared seventh week, complete recovery following.

Stewart's case—Large advancing lower thoracic aneurism; two and one-half feet of wire used; current gradually increased to seventy milliamperes; continued for one hour. Rupture on ninth day. Necropsy: Firm clots in all portions of the aneurism, with softened ones, evidently of recent origin; difficult to separate the clots from the wire.

Stewart's case (second)—Report not yet complete, although case is still living, and was treated much the same as previous case, nearly two years ago.

It will be with no small amount of interest that the result of this last case of Dr. Stewart's will be awaited, as it was through the courtesy of this gentleman that the technique of the operation performed in the present case was learned; and there can be no doubt that upon the results obtained by such an operator can be placed the true value of this method of treatment. And, although the results of this case have been gratifying indeed, there can be no doubt but that in his hands the results must have been even more satisfactory.

In most of the cases narrated any operation seemed hopeless except Kerr's second case and Rosenstein's case. Then, too, Stewart's last case will show very beneficial results. Allowing the case reported this evening to rank among the greatly benefited, and counting Kerr's, Rosenstein's and Stewart's cases as cured, we have 30 per cent. cures, 20 per cent. benefited, and 50 per cent. fatal, and none of the fatal cases in which death was the result of the operation; and with the bright prospect of the case reported this evening bringing the percentage of cures up to 40.

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DISCUSSION.

Dr. W. W. Grant—I wish to make one suggestion in regard to the treatment of aneurism by this method. In the first place, the result in the case of Dr. Hershey is extremely gratifying, and to my mind this treatment is preferable to any other in certain cases in this locality. It seems to me that it is applicable only to a distinctly sacculated case. I cannot believe that to produce a prompt clot in any other kind of case is fraught with anything but imminent danger. The clot will not retain its place unless the aneurism is distinctly circumscribed and sacculated, and has something of a neck to it. I suppose that was the case in the one under consideration; at any rate, the good result to date would indicate it.

Dr. Leonard Freeman—I should like to ask Dr. Hershey whether it would be possible to push the wire entirely through the needle into the aneurism, and then pass the electric current through the needle itself, the point of which is in contact with the wire? The needle, of course, would have to be plugged to prevent bleeding. This method would do away with the difficulty of removing the needle from the wire after the two had become cemented together by congealed blood. Dr. Hershey's method of treatment seems to offer the best chance of curing these so-called incurable aneurisms. There is no other operative treatment which seems to be so reliable, or so comparatively free from danger. Even the method of McEwen does not seem to be so satisfactory, at least when theoretically considered. It consists, as is well known, of scratching with a needle the lining of the sac, so as to produce an exudation. But it is difficult to tell accurately whether we are scratching the wall of the aneurism, or merely the surface of a firm clot which is often found covering the wall. And, furthermore, there must be some danger of perforating the aneurismal sac, especially as we are often uncertain as to its thickness. I heartily congratulate Dr. Hershey upon his success.

Dr. Hershey—In answer to the question of Dr. Freeman, about pushing the wire through, if that could be done it certainly would be the proper plan; but it is rather a difficult matter to push this fine wire through. As it was, the wire kinked

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while I had it in the most excellent condition, and I think there would be no way that you could pass it through. If I ever do the operation again, I shall take a needle of twice the calibre, I think, and take Dr. Freeman's suggestion and use a larger needle. One can very well imagine how a man will feel when he has thrust a needle into the aneurism—he wants it as small as he can possibly get it; but another time I shall certainly use a needle at least twice the calibre, because I would not have a particle of fear in puncturing an aneurism and pushing the needle all the way through, using the needle as an electrode.

A SIMPLE AND EFFECTIVE ELECTRIC PROBE.

C. B. LYMAN, M. D., DENVER, COLO.

There have been several electric appliances devised for the purpose of locating bullets and other metallic substances within wounds. The apparatus which I have to show you to-day makes use of the telephone receiver; the patent on this instrument has now expired, and they can be bought in the open market at a small figure. The apparatus is exceedingly simple, and as effective as it is simple. It consists, first, of an ordinary hand telephone receiver, or of a receiver which can be attached to the head by means of a metal band, thus leaving both the surgeon's hands free; second, of a probe made of copper, and which is to be attached to one pole of the electro-magnet contained within the receiver; third, of a small plate of zinc, which is to be attached to the other pole of the magnet—this plate is shaped to conform to the upper surface of the tongue. In using this apparatus, the zinc plate is placed in the patient's mouth on top of the tongue; the receiver is placed to the surgeon's ear, and the copper probe is used in the same manner as an ordinary probe would be. When the probe touches any metallic substance a distinct click is heard in the telephone receiver, a circuit having been established, the patient's body being the battery.

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Minute pieces of metal give the same results as a bullet, as it takes but a very small amount of electricity to operate the receiver. With this appliance there is no danger of a short circuit being established, as might sometimes happen if one were using a probe made of two metals.

Other electrical appliances for this same purpose are in the market. There is one which depends upon the use of a battery with an open circuit. The probe is made in two parts—one of zinc and the other of copper—properly insulated one from the other, except at the tip. A galvanometer is introduced in the circuit, and when the two tips of the probe touch any metallic substance in a wound, the circuit is closed and the galvanometer deviates.

Lilienthal, of New York, has lately devised a probe consisting of parallel wires of zinc and copper properly insulated one from the other, the tips alone being exposed. Each is attached to a small metal plate. These plates are to be placed on either side of the surgeon's tongue, and when the circuit is closed by the tips of the probe coming in contact with a metallic substance, the surgeon perceives a peculiar metallic taste in the mouth.

Gerdner, of New York, has also devised a telephone bullet probe, but I am not familiar with the principle of it.

This instrument was made for me by the Ford Optical and Surgical Instrument Company, of Denver, Colorado.

DISCUSSION.

Dr. Geo. W. Miel—We have been investigating this telephone probe and find it a very handy and most useful contrivance. Any one seeing it, when having any occasion to remove a foreign body in the nature of a metallic substance, would certainly want one of these instruments. This carries out something that I said last night in regard to the use of the probe. We have not retired the probe. The probe has not been used intelligently. Occasionally we cannot use the probe in seeking foreign bodies with advantage; very often we can. This device marks a long stride in advance of anything of the kind we have at present. The first departure from the ordinary probe was seen when the porcelain tip was used in seeking for a bullet,

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and on which a lead mark was made when the bullet was found. I have had occasion to use another device. A man accidentally shot himself; the bullet had gone upward, striking the humerus, and wrapped around the humerus very much as a piece of tin-foil might have wrapped—very thin, and flattened. I let the matter rest for a few days, knowing that irritation would give some information on the subject, and when inflammation supervened, I made my diagnosis by forcing into the lead an exploring needle; in withdrawing which you bring the lead with you—it follows only a short distance, and then drops off.

REPORT OF SEVEN CONSECUTIVE CASES OF APPENDICITIS.

FRANK FINNEY, M. D., LA JUNTA, COLO.

The following brief summary of cases coming under my care during the last six months may be of interest to members, especially with reference to the point as to what cases should and what should not be operated:

Case 1—H. L., male, age 20; October 29, 1895, at Fowler, Colorado; patient of Dr. Reed, by whom I was called in. The patient had, about a month previous, been sick with a similar attack of a milder type. When I saw him he had been sick eight days; pulse and temperature had been almost constantly above 100; marked tenderness at McBurney's point, and general peritoneal tenderness and tympanites; vomiting and constipation followed by looseness of bowels. Diagnosis: Suppurative appendicitis; operation was advised and consented to. I operated the same morning; found a walled-off abscess, which was opened and drained, iodoform gauze drainage being used; the appendix was not readily found, and was therefore left alone. The patient made a good recovery, except a small sinus. Some weeks later, as the drainage still continued, I found concretions by the use of the probe, and opened down and removed them; they were largely made up of small seeds. The patient then made a perfect recovery.

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Case 2—December, 1895; M. B., male, age 21; at La Junta, Colorado; case of Dr. Timmerman, by whom I was called. Diagnosis: Suppurative appendicitis. Patient was taken sick on Tuesday night with severe colicky pain and vomiting; bowels constipated; doctor was called in; gave hypodermic of morphia, and ordered salts to be given in morning. Wednesday pain continued and became localized at McBurney's point; pulse rose steadily, and temperature was about 100. I was called in on Wednesday, and advised delay in operating until Thursday morning, with a close watch on pulse and temperature. Thursday morning, pulse rose to 120, temperature 102. We prepared patient and operated at 11 A. M.; found about one ounce of pus about the appendix, which was highly inflamed and dark colored; appendix removed, and found to contain two concretions of fecal matter and small amount of pus. Drainage of iodoform gauze was put in; patient made a good and uninterrupted recovery.

Case 3—January 29, 1896; A. B., male, age 22; near Las Animas, Colorado; case of Dr. Dulin, by whom I was called in. Patient was taken sick on Monday; violent pain in stomach and bowels, with constipation. He took six liver pills which "worked," but symptoms did not get better. Pain became localized at McBurney's point, with violent general peritonitis. I saw him Wednesday night; pulse 120, temperature 102 2-5; pain violent. Diagnosis: Suppurative appendicitis; operation advised and consented to; operation done early Thursday morning. A quantity of dirty pus was let out on opening peritoneum; appendix was diligently searched for, but not found; cavity was thoroughly flushed out with saline solution and drainage consisting of iodoform gauze was put in. Patient made a good and uninterrupted recovery; appendix was not removed.

Case 4—March 23, 1896; T. M., male, age 50; at La Junta, Colorado. Patient was taken sick with pain in stomach and bowels, with vomiting and constipation; patient says he has had just such attacks before. I saw him soon after attacked; pain had localized quite markedly at McBurney's point; pulse 86; temperature 99 2-5; gave him hydg. cum creta, grs. 12, fol-

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lowed with salts; also gave an opiate to quiet pain; heat applied locally. Diagnosis: Catarrhal appendicitis. I advised patient of his condition, and that an operation might become necessary at any time, but kept him under very close observation, relying upon the pulse chiefly for my guide to operate or not. The pulse did not in this case rise above 100, and the temperature did not rise above 100°; but the tenderness and board-like feeling continued six or eight days. The patient recovered without an operation.

Case 5—J. W. B., male, age 26; at La Junta, Colorado. I was called in to see the man at his boarding house early in the morning of April 24, 1896. He had been taken sick the day previous with pain in stomach and bowels, with vomiting and constipation; had taken a large dose of castor oil the night previous to my seeing him, which had moved his bowels freely. When I saw him he was having severe pains all over bowels, but careful examination showed marked localized pain at McBurney's point. I gave him 1-2 grain morph. sulph. hypodermically, and took him in my buggy to the hospital. After he was put to bed at hospital his temperature was 101 3-5, and pulse 88; pain much relieved by the morphia. Diagnosis: Suppurative appendicitis. The tenderness continuing very marked, I advised operation, but patient was adverse to it and pleaded for delay. The temperature during the next four days ranged from 99 to 102 4-5, and the pulse from 80 to 120. On the 29th I advised the patient that he must be operated, and proceeded to have him prepared. The operation was done at 3 P. M. that day; found pus present in large quantity. The appendix was a very long one, with some adhesions, and it had sloughed out at one side, releasing from its interior a large concretion. The appendix was removed and found to contain one other concretion. The cavity was flushed out with saline solution, free drainage procured with iodoform gauze, and the wound partially closed. The patient made a good recovery, but rather slow owing to his septic condition.

Case 6—Wm. W., male, age 20; May 10, 1896; at La Junta, Colorado. Patient came to hospital from an extra gang of laborers. He was suffering severe pain in bowels, and gave his-

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tory as follows: One year ago had an attack beginning with pain in stomach and bowels, with vomiting and constipation, pain being most severe in right side. He was laid up over a month with that attack, and has never been entirely well since. From that time up to the present he has had four such attacks, but of less duration. I put the boy on the table and made a careful examination of his abdomen. The tenderness in the region of the appendix was well marked, and a very marked board-like feeling was present on that side of the belly; temperature 98 2-5; pulse 60. Diagnosis: Catarrhal appendicitis. An operation was advised and done the same afternoon; operation revealed a mass of adhesions such as precluded the removal of appendix. The appendix and caecum were involved in a mass of omentum, and the mass was adherent to peritoneum and everything else in the neighborhood. Many adhesions were separated and tied off with catgut, but we were unable to get the appendix isolated; no pus was encountered. The cavity was thoroughly flushed with hot saline solution, and as there was a good deal of serum for which exit had to be provided, a large glass drain was put in for twenty-four hours. The patient made an uninterrupted recovery, and since the operation has no pain nor tenderness in bowels.

Case 7—E. C., male, age 37; May 10, 1896; at La Junta, Colorado. The patient was a traveling man, and I was called to see him at his room. He had been sick all night with pain in stomach and bowels and vomiting; bowels loose; quite marked tenderness at McBurney's point; pulse 90; temperature 99. Diagnosis: Catarrhal appendicitis. The patient gave a history of one former attack about two months previous, at his home. I advised him that an operation might become necessary, and in fact would probably be the best thing for him; but he would not consider such a proposition. He was given morphia in 1-4 grain doses hypodermically, and made a good recovery in five or six days, neither pulse nor temperature going above 100 during the attack. This patient will, in all probability, have attacks of appendicitis in the future.

Now, a few words as to when we shall operate, or in what cases. Some of the best authorities advise operation in all

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cases as soon as diagnosis is made—viz., Robert T. Morris (Medical Record, February 15, 1895), and J. B. Murphy (Medical Record, August 31, 1895). Wyeth and others are, I think, almost as radical in their views. I have recently read an article on this point by Prof. Willy Meyer, in the Medical Record of February 29, 1896. He puts great stress on the state of the pulse, and considers the indication given when—the other symptoms being well marked—the pulse goes above 116 to 120. In my small experience I am inclined to look upon the above as a pretty safe guide. It has proven so in the few cases I have here reported. The authorities all agree, in case of doubt, to give the patient the benefit of the doubt and operate.

DISCUSSION.

Dr. W. P. Munn—Dr. Finney's cases, it seems to me, will illustrate the point that has been coming more to be recognized within the last couple of years, and that is, that almost every case of appendicitis is an atypical one; that is, it departs to a certain extent, whether greater or less, from the classical description. The point in reference to the value of the pulse as an indication for operation is perhaps one of the most important that has been brought before the profession during the last year. Temperature is an absolutely unreliable guide to suppurative conditions of the abdomen; the pulse, however, is a guide which is fairly reliable; and as Dr. Finney has said, when the pulse rises higher than 116 or 120, with the other symptoms of appendicitis, the probability is that the patient will be given the best chance by operative procedure. Two of his cases illustrate the fact that patients may make good recoveries, and stay permanently or practically well, if the appendix is not removed. This, again, is a change from the radical surgery which was even two or three years ago by many authorities advocated, which stated that it is absolutely necessary to remove the appendix in every case. It has been well proven that removal of the appendix is often more dangerous than leaving it, if it is so bound down by adhesions that it cannot be safely removed. If it is so covered over that it cannot be readily recognized, further search for it, or further effort to remove it is doing an injustice to the patient. If the sac containing pus can

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be easily drained, and is freely opened, the patient will probably recover and remain free from subsequent attacks of appendicitis. I am impelled to report one case in which I have observed the pulse varying from the rule of which we have spoken this morning—that was a patient who was for ten days treated under the supposition that he was suffering from typhoid fever of a mild type. The temperature never ran over 100, the pulse between 85 and 90; and yet I found appendicitis, and an operation necessary. The whole abdomen was found full of putrid pus; the appendix had sloughed off, and the sac of the cæcum was practically gangrenous; the patient died eighteen hours after the operation; all this with a pulse which had rarely risen above 90, and temperature not above 100. This emphasizes the fact that each case of appendicitis is a law to itself; each case is an atypical one, and will depart more or less widely from the usual classical descriptions.

Dr. Finney—In regard to the removal of the appendix: While it may be the consensus of opinion of authorities that it is not best to search much for the appendix, I believe that where it can be found with any reasonable amount of search without breaking down too much in the way of adhesions, it should be removed. The first case I reported here illustrates that fact. I believe that if I had removed the appendix in that case I would have had no further trouble; as it was left, I did. There was an appendix there which had some concretions in it, and they had either sloughed out of the appendix or did so after the operation, and had to be removed subsequently. They were largely made up of small seeds. The patient had been eating largely of raspberry jam for a long time before. Where it can be done, I think the appendix should be removed if it can be done with any reasonable amount of search for it. As Dr. Munn says, I do not believe that any description of appendicitis will cover all the cases.

In regard to the case Dr. Munn speaks of as being diagnosed as a mild case of typhoid fever, some of you perhaps remember that I reported a case about four years ago, when appendicitis was first being talked of before the society. The case was sent to me as typhoid fever, and I operated—one of the first operations done in the lower part of the state; the pa-

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tient died. It was sent to me as a case of typhoid fever, and I treated the case for some seven or eight days with that idea, without making a very careful examination of his abdomen; and as appendicitis was a new thing in those days, I did not discover it until he had been in the hospital about seven days, going by his pulse and temperature, which were almost typical of typhoid fever; but finally my attention was particularly drawn to his complaining here (indicating), and I examined him, decided he had appendicitis, and operated. The man died a few days after the operation. The two cases reported by Dr. Hall, yesterday, I am inclined to view as Dr. Grant did —that they were cases of appendicitis, and not cases of typhoid fever and appendicitis combined.

A BRIEF REPORT ON TWENTY CASES OF APPENDICITIS SEEN DURING THE PAST YEAR.

CHARLES A. POWERS, M. D., DENVER, COLO.

However threadbare the subject of appendicitis may have become during the past few years, the frequency and danger of the disease, as well as the conflicting views regarding its proper management render it still a topic of exceptional interest. An affection which not infrequently threatens life from its very onset, one in which the differential diagnosis is often extremely difficult, even in the hands of men of the widest experience, and one in which the most careful weighing of symptoms is required for the proper determination of the question, "whether to operate and when to operate," may well continue to engage our attention, hackneyed though it may be termed.

With the causation and pathology of this disease we are now tolerably familiar; so, as well, with its course and various terminations. The main problem which confronts physicians and surgeons alike is that of determining whether or not operative interference shall be made; and in the consideration of this we find two classes of extremists—the one maintaining

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that every case should be submitted to operation so soon as the diagnosis is established, while the other would postpone in all cases operation until an abscess of size has formed and has made such safe attachment to the abdominal wall that it can be evacuated by a simple incision without opening the general abdominal cavity. It is my belief that these views are equally erroneous; that each case should be studied, weighed and determined from its individual symptoms, and that the result of this careful study should decide as to whether operation or delay be the safest course. And in support of this, I bring before you in a very brief way the cases which have come under my observation during the past year, each of which I have seen in consultation with the attending physician or surgeon. These have been twenty in number (nineteen acute and one chronic), and are thus divided: Subjected to operation by me, six; seen in consultation and operated by the attending surgeon, three; operation advised but refused, patient recovered (subsequently having appendix removed in interval), one; operation advised but refused, patient died, one; operation advised against, nine. The histories of these cases are briefly as follows:

Case 1—On June 26, 1895, I was asked to see a lad of 14 years in consultation with the family physician. Six days previously he had been awakened from sleep by a sudden, sharp pain in the right iliac fossa. He had vomited several times; the pulse was 100, the temperature 101° F. The bowels were moved by enemata; gradual development of a tender tumor in the right abdomen, just outside and below the umbilicus, the temperature ranging from 100° in the morning, to 102° or 103° in the afternoon; the pulse 90 to 100. When seen by me the lips and tongue were dry and the face anxious; the right abdomen was very rigid, the left side partially so. The right thigh was flexed. A large tender mass was felt in the right iliac fossa, well toward the median line; temperature 102°, pulse 96. Immediate operation advised, but delayed for twenty-four hours by the parents. On June 27, a three-inch incision was made at the outer aspect of the tumor; general peritoneal cavity opened; the tumor was found to lie behind and within the caecum; general cavity walled off by gauze packing, and the finger gently passed down to the outer side of the caecum, breaking through

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the adhesions and liberating six ounces of very foetid pus; gentle irrigation, gauze packing; time of operation, twenty-five minutes. The temperature and pulse did not fall for forty-eight hours, indicating a moderate degree of septic absorption. Gradual convalescence, healing at the end of five weeks; firm scar.

This is an excellent illustration of the class of abscess which lies behind and to the inner side of the caecum. They do not tend to become fixed to the abdominal wall; they are liable at any moment to rupture into the general abdominal cavity. One must traverse the free peritoneal cavity before opening the abscess, and the greatest caution must be taken to avoid its infection. In contrast with this, permit me to cite

Case 2—A young man of 20 years; seen by me on May 17, of the present year. History: Ill for nine days with what had been thought appendicitis; small, tender lump just inside the anterior superior spinous process; temperature 99° to 99 1-2°, pulse 70 to 80; no abdominal distention. On May 15, two days before seen by me, he had experienced a sudden sharp pain in the right iliac fossa; the temperature rose to 101°, the pulse to 100. On the following day the temperature was 101° in the morning, 102° in the evening; the tumor rapidly increased in size. Examination May 17: Morning temperature 101°, pulse 118; tongue dry; abdomen slightly distended; tender, hard, sausage-shaped mass the size of the fist in the right iliac fossa, rather nearer to the umbilicus than to the anterior superior spine. Immediate operation; two and a half-inch incision at outer border of mass; on opening the peritoneum eight ounces of foetid pus escaped; adhesions very flimsy; no attempt made to find the appendix; inner wall of cavity formed of small intestines loosely glued together; rubber drain, gauze packing. The temperature and pulse fell to normal in twenty-four hours and the convalescence was undisturbed; firm healing at end of two and a half weeks.

In cases similar to the foregoing no attempt should be made to find the appendix. Its removal is attended with great risk of breaking down the adhesions and infecting the general cavity. Death is not infrequently caused in this way.

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Case 3—A boy of 8 years; typical history; chill, vomiting, high fever, abdominal distention, tenderness and pain in the right iliac fossa; operation on the third day; appendix inflamed, bent on itself; a large concretion at its middle; appendix removed; stump closed in by Lembert sutures; prompt healing; patient up and about in two and a half weeks.

Case 4—Appendicitis simulating perinephritic abscess; a boy of 14 years; seen with family physician, November 6, 1895. History: One week previously suffered with malaise, pain in right loin; four days ago chills; temperature 101° to 102°, pulse 100; pain in right iliac fossa, localizing in right loin posteriorly. Examination: Tender, boggy swelling over right kidney posteriorly; 5% albumen in urine. Large exploring needle passed to the kidney draws pus; incision on this needle through quadratus lumborum to surface of kidney liberated five or six ounces of foetid pus. The pus seemed to come from the outer and anterior surface of kidney; gradual healing. Six weeks later fever and pain preceded the reopening of the wound, from which a fecal concretion escaped. This was followed by prompt and permanent healing.

I can make no doubt that this abscess originated from an appendicitis which doubtless passed upward behind the caecum. The pus worked backward and appeared behind the kidney. Such fecal concretion as this which I show you is pathognomonic of appendicular abscess.

Case 5—A boy of 14 years; seen by me on April 26, 1896. About two days (the Saturday) previous to this vomiting, abdominal pain localizing in right iliac fossa, high fever. Bowels had been thoroughly moved by salines. Examination (Monday): Temperature 101 1-2°, pulse 120; tongue dry; face very anxious; abdomen moderately distended; very rigid and exquisitely tender on the right side. Immediate operation advised and concurred in by family physician, but refused by the parents. On the following day (Tuesday) the temperature and pulse had both fallen; the abdomen was the same—rigid and tender. Wednesday: Temperature 99°, pulse 100 to 108; abdomen more distended and tender; repeated vomiting. Again advised operation. On the following day the parents sought

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me and requested operation. The boy had constant vomiting; all symptoms of a general peritonitis. Operation undertaken as a forlorn hope. Two quarts of foetid pus behind the caecum, reaching up to the liver; general suppurative peritonitis; thorough washing out. Patient died in eighteen hours. Comment on this case is unnecessary. If operation were to be of avail, it must have been done at an early hour. This was recognized by the family physician, but not by the parents. I am not in favor of last resort operations—they are almost invariably fatal, and tend to bring discredit on operative surgery in general. When, however, they offer the patient a chance, however slight this may be, the surgeon has no right to refuse it.

Case 6—Male of 20 years; typical onset of appendicitis; second attack; steadily increasing pulse and temperature; exquisite tenderness in right iliac fossa; operation at end of forty-eight hours; appendix gangrenous; gauze drainage; prompt healing.

The following four cases were seen by me in consultation, operation being made by other surgeons:

Case 7—A boy of 14 years; August 20, 1895; fourth day of typical attack; circumscribed abscess; simple evacuation; prompt healing.

Case 8—Seen with the attending surgeon in August, 1895; man of 35 years; first day malaise, vomiting, abdominal cramps; pulse and temperature normal; salines. Second day: Tender in right iliac fossa, watery passages, vomiting; temperature 98 1-2°, pulse 100. Third day: Pain in right abdomen; tympany; temperature 103°, pulse 112. Fourth day: At 7 A. M. very sudden and severe pain in right abdomen; partial collapse; temperature 99 1-2°, pulse 90 and jerky; exquisitely tender in right abdomen, this side being rigid; slightly rigid on left side. He was seen by me, and the diagnosis of gangrenous appendicitis rupturing into the free cavity was made. Immediate operation was skillfully performed by the attending surgeon. The appendix was found gangrenous and perforated, lying free in the general abdominal cavity; the right abdomen contained pus and feces; thorough lavage; death in forty-eight hours.

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Case 9—Was exceptional, in that at the end of ten days the temperature had at no time been above 99 1-2°, nor the pulse above 70. Operation was advised because of the general malaise and the great degree of increasing local tenderness. On opening the abdomen the appendix was found to run up behind the caecum, to be gangrenous, and perforated at its tip, about which lay two drachms of pus.

Case 10—A girl of 6 years; was seen on June 28, 1895, in consultation with the attending physician. She was in the third day of an acute appendicitis; the pulse 120, the temperature 100 1-2°; the abdomen much distended and exquisitely tender. It was probable that a general peritonitis existed. A suggested operation was scouted by the parents, who averred that Dr. Blank had twice carried her through similar attacks. A delay of twelve hours was made; other advice summoned and operation carried out. A large circumscribed abscess was evacuated and the patient recovered.

Case 11—Girl of 8 years; seventh day of a typical attack, No physician had been called until the very day on which I saw her. *Status praesens:* Face livid, extremities cold, perspiring freely; temperature 102°, pulse 140, respiration 34; abdomen moderately distended, very rigid, tender and tympanitic. The slight chance afforded by operative interference was explained and offered to the parents, but they refused it and the child died in twenty-four hours.

Case 12—Was that of an Italian of 30 years, who was undergoing his third attack. I saw him on the third day. The temperature was 102°, pulse 92; face flushed; tongue dry; abdomen moderately distended and tympanitic, very rigid on right side, slightly so on left; small, very tender tumor at the site of the appendix. Operation was strongly advised, but refused, and somewhat to my surprise, the patient recovered without an abscess. I am told by the attending physician that he subsequently had two other attacks, and returned to his home in Italy, to have the appendix removed there.

Each of the remaining eight cases, with one exception, I saw during an acute attack. In each I advised against opera-

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tion and each recovered, and all have thus far remained well. The exception was that of a man who had had two slight attacks, and who consulted me about the interal operation.

The time limit wisely put upon our papers by the executive committee forbids the recital of these histories; indeed, their similarity might render them tedious. In each the various symptoms were carefully weighed and delay made from one six- or twelve-hour period to another. In no case was this delay prejudicial to the interests of the patient. These were, however, cases in which the symptoms were improving rather than increasing in severity.

In a discussion on this subject before this body one year ago, I expressed the opinion that cases in which the symptoms grew worse at the end of thirty-six or forty-eight hours would be safer with operation than with delay, and I have not yet had occasion to amend this.

I have never yet had cause to regret early operation, while I have not infrequently wished that it might not have been delayed so long. The per-acute cases—those in which the initial symptoms indicate perforation—demand operation at their very onset; and all cases in which it is determined that pus is present should be subjected to operative procedure. We hear the remark that it is of no use to call the surgeon in these cases, for he will surely wish to operate. The surgeon desires the recovery of the patient, be this with or without operation. In my own cases of the past year the percentage in which no operation was advised is perhaps rather greater than usually falls to the lot of the consultant. However, I can do no better than to repeat that each case of appendicitis must be judged upon its individual symptoms; that those symptoms must be carefully weighed every few hours, and the decision as to operative interference made to rest thereon.

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REVIEWS OF SOME POINTS OF SURGICAL INTEREST IN ABDOMINAL CASES.

EDMUND J. A. ROGERS, M. D., DENVER, COLO.

It is not my purpose to write full reports of a long series of cases, but simply to give you some interesting points observed in some of the abdominal cases operated upon during the past year.

Two cases of abscess of the liver have come under my surgical treatment in that time.

Case 1—J. A., a patient under the care of Dr. Sewall, in St. Luke's Hospital; was aspirated on October 13, 1895, when over a quart of creamy pus was drawn off, the needle being passed between the ribs, through the folds of the pleura. On the 15th one pint of clear serum was drawn from the right pleura. The liver only slightly enlarged again, but the pleura rapidly refilled and the septic symptoms became more pronounced. Multiple punctures with the needle, on the 24th, failed to find pus again in the liver, and it was deemed unwise to draw the serum off the pleura again until a radical operation was done on the liver. On the 29th, while preparing for this operation, death occurred suddenly.

The post-mortem revealed the pleura filled with pus, while an open fistula connected this cavity with the abscess cavity in the liver. The sinus seemed to have slowly formed along the tract of the first aspiration, and, therefore, pus did not appear immediately in the pleura.

An immediate radical opening of the liver, upon the first discovery of the pus, might have saved the patient.

Case 2—A. L., age 19; had been Dr. Coleman's patient, with obscure intermittent symptoms extending over many months. The liver was found greatly enlarged, and aspiration showed a thick, dark chocolate fluid, made up chiefly of broken down liver tissue.

On June 16, 1896, at St. Luke's Hospital, I excised about two inches of the eighth rib, and then exposing the pleura, stitched both layers to the sides of the external wound with-

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out allowing the lung to collapse; then, cutting through the diaphragm, I began stitching the liver capsule into the opening. The liver tissue was, however, entirely gone under the capsule, and the fluid from the abscess rapidly burst through the stitch holes. Finding it escaping, I requested Dr. Craig, who kindly assisted me, to press the liver up from the abdomen, and make a free opening, hoping to prevent further escape into the abdominal cavity. This was unsuccessful, however, as although some quarts of fluid came through the wound, a considerable quantity ran down into the abdomen. I therefore, after irrigating the apparently almost empty liver capsule, made a central abdominal incision and washed out the whole peritoneal cavity. To do this, I used many gallons of water and salt solution. Then, by deep catgut sutures, I stitched the capsule opening into the external wound, and packed the liver cavity carefully. I also left drainage from the abdomen, through the lower wound for a few days.

The cavity in the liver was kept thoroughly cleansed and closed very slowly. The amount of thick, ropy, muco-bilious debris that was secreted was simply marvelous, many gallons being removed before the wound finally closed, about May 1.

The patient is now enjoying very fair health, and is rapidly gaining in weight.

During the year I have used the Murphy button twice; also in both cases in St. Luke's Hospital.

Case 3—On July 22, 1895, I operated upon Mrs. H., aged about 35; had had repeated severe attacks of marked biliary obstruction with other obscure abdominal symptoms.

No calculi were found, the gall bladder being small and empty. Cholecystjejunostomy was performed, the smallest Murphy button being used. The small intestines were not disturbed except to draw the first found loop of the jejunum up into the operation area; the intestines below were not in any way handled.

The patient rallied thoroughly and appeared to be doing well, but symptoms of acute intestinal obstruction supervened. Presuming these to be due to septic peritonitis, I did not open the abdomen. Death occurred on the third day.

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The post-mortem showed an entire absence of peritonitis. The area operated upon was in a very satisfactory condition. Approximation was perfect, and there was no irritation of the tissues about this portion of the cavity. The highest portion of the jejunum had been drawn up and lay very satisfactorily.

In the lower ilium a volvulus was found which completely occluded the last few inches of that bowel. From the thickened walls of the intestine, its contracted lumen and its anaemic condition, there seemed no question of old disease here, and this also explained the obscure symptoms before spoken of, which were referred to this location.

Case 4—In this case the button was used in a palliative operation with marked success. Mrs. H., age 68; a patient of Dr. Stedman, suffered excruciating pain from a large circular, carcinomatous tumor of the descending colon. Anastomosis was made with the largest round Murphy button between the lower ilium and the sigmoid flexure.

The "old agonizing pain" which had persisted for many months, disappeared with the operation, and the patient lived her remaining weeks of life in comparative comfort. Life was undoubtedly prolonged and torture relieved by the operation. The button was passed on the thirteenth day.

We are having so much written on appendicitis that it seems almost unnecessary to say more, but there are a few points noted which seem of sufficient interest to justify their mention.

Case 5—On September 20, 1895, while substituting for Dr. Parkhill, at the County Hospital, I opened a large appendicular abscess for H. P. M. The abscess cavity extended from the concave surface of the liver into the pelvis, and the intestines were displaced to the median line. The cavity closed slowly, and a small sinus persisted with a ventral hernia.

On February 21, he having returned to the hospital for thorough renovation, I operated again. I found the appendix in situation and surroundings much as I would have expected to find it in the interval of a mild recurrent case. Rupture of the appendix had occurred, and there were slight adhesions binding it down, but all signs of the old immense abscess had

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disappeared. I could find no indications by adhesions or displacements of the great disturbance that I found there before. It was difficult to believe that nature could so completely restore after such extensive inflammation. The result was satisfactory, but the stitches in the abdominal wall were torn out in moving the patient, owing to the confusion caused by the typhoid epidemic in the hospital. The peritoneum, however, remained closed, and a third operation, on March 26, resulted satisfactorily for the hernia, also.

Case 6—Upon February 21, 1896, at the County Hospital, I operated for Dr. McLauthlin upon W. The tumor was low down in the right iliac fossa, but there was no tenderness or fullness whatever at the McBurney point.

Case 7—At St. Luke's Hospital, on September 8, 1895, the appendix was found perforated, with a small quantity of pus about it. The tissues behind it were massed and indurated. The wound was packed and kept open. On the second dressing on the second day, about an ounce of creamy, non-foetid pus broke into the bottom of the fossa from behind, showing a deeper abscess not opened at the operation.

In cases No. 8 and 9, operated on in July, 1895, eleven months ago, where pus was simply evacuated and no appendix searched for, no secondary operation has been necessary, recovery seeming complete. In both I expected to later perform a secondary operation before recovery would take place.

Case 10—In this case the symptoms pointed to severe general peritonitis, but none was found; (extensive tympanites, general tenderness, temperature of 104°, etc., etc.) The appendix lay high up behind the caecum with much thickening, but no pus.

Case 11—On March 22, in a child aged 6; I found no pus, but very extensive adhesions. The omentum was rolled into a large, thickened mass and adherent to the parietal peritoneum. The appendix was upward and forward. Death came twenty-eight hours after the operation. This was my last case, and my first mortality. I may, I suppose, expect a change of fortune to begin with it.

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DISCUSSION.

Dr. H. G. Wetherill—There is one point which in my opinion is of great practical importance: Dr. Rogers found no tenderness whatever at McBurney's point; and another, he found the abscess from the ruptured appendix high up under the liver. It illustrates what may be the range which an appendicular abscess may cover. In doing pelvic work, it is not an uncommon thing to find an appendix abscess in connection with tubo-ovarian abscess. On two occasions I have found an appendix adhering to abscessing tubes, and in both cases it was necessary in the removal of the tube and of the abscesses, to remove the appendix in order to make a complete and clean operation. The fact that tenderness does not exist at McBurney's point is not a sure contra-indication of appendicitis. So far as the free end is concerned, it may be back of the cæcum, high up towards the liver, or low down in the pelvis. Cases in which the appendix has been found in hernial sacs are not uncommon by any means. In doing operations for appendicitis, these facts should be borne in mind.

Dr. Geo. W. Miel—In regard to the causes of appendicitis, I would like to cite a rather unusual and interesting case briefly. With a great many people, kneading of the abdomen is practiced to overcome constipation, and this without any harmful result; but in a case of appendicitis which I saw some eighteen months ago, this really had been the cause of the appendicitis. The cæcum being more or less occupied with fecal matter, practice of this measure—perhaps with too much vigor, in this instance by a woman (medical student)—forced fecal matter into the appendix. The case was marked and serious, but did not require surgical interference.

Dr. Elder—I am glad to say something about the marvelous case of liver abscess upon which he operated. Dr. Rogers did not call it a marvelous case, but I do. I had the very interesting duty of dressing this case every day for some time, and when I began to dress it, I could pass a glass irrigating tube about eight inches through the opening in his side into the abscess cavity, and I used to wash out of that cavity about two ounces

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every day of a mixture of pus and what was apparently liver substance. I wondered when dressing the wound how long the pus and the liver could possibly hold out; and on introducing my finger into the cavity after I irrigated it, I could still feel, but could not get out, by any conservative means, a great deal of the loose substance in different pockets in his liver; but from day to day the discharge gradually stopped, and when I left the hospital, in May, he was a fat boy, with a very small discharge sinus. I am glad to know from Dr. Rogers that even the small sinus has closed, and that he is in perfect health.

Dr. W. W. Grant—Referring to one of Dr. Rogers' cases of appendicitis, it reminds me very much of the paper that was read of a most interesting case, by Dr. Hall, in which he speaks of a secondary abscess existing, which finally opened itself from the bottom of the first abscess and discharged and got well. I stated yesterday in this discussion of Dr. Hall's case that it was not typhoid fever with appendicitis, in my opinion, at all—and I think so still—but that it was a case of septicæmia—a loss of sixty pounds in twenty-three days, from secondary abscess that had not been discovered or explored. I think that this must have been so. As a rule, a small amount of pus will keep up septicæmia in just such a way, and as is detailed in this case, from two to three weeks, or longer than the twenty-third day. It is evident that this case was one of septicæmia, and that Dr. Rogers' case was one exactly like it, only in his case the abscess discharged outward. The case of Dr. Hall was a gradual discharge, and not until the abscess had entirely healed did absorption cease and the patient get well. These cases are extremely interesting. The question still is, whether appendicitis is a medical or essentially a surgical disease. I am inclined to the latter view. I believe, and I make the statement, that if every case of appendicitis should be operated on promptly and early in its history, that the mortality would be less than it is by the present mixed method of medical conservative treatment and occasional operation. I think the trend of surgical opinion in this country is to this effect. I am certainly convinced that

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the case reported by Dr. Rogers is one that is probably an example. In the case of the child, the only unfortunate one, if it had been operated on immediately, it is not likely that the patient would have died. I believe this, for the reason that it is not possible for any surgeon or physician to tell at the beginning of many cases just what course the disease will take—whether a severe and short one, or whether it will run a mild course, as some evidently do, and recover without operation. It is not possible to tell or diagnosticate the conduct of these cases. It is not possible for us to know that this case will not end in suppuration, and that by perforation, feces and pus will enter the peritoneal cavity, and the patient die of septic peritonitis. This would be avoided by early operation, and the mortality would be decidedly less.

Dr. Edmund J. A. Rogers—There is very little to add to what has been said. In the case that Dr. Grant refers to first, No. 7, where the secondary abscess opened, the lady had for a number of months had symptoms indicating indigestion and abdominal disturbances; but the onset was very acute, and the operation rather prompt. She was able to go out to a dinner party on Thursday night; during that night she was taken with acute symptoms of what was called cholera morbus, and the operation was performed on Sunday. The little child, No. 11, with the extensive adhesions, also, was a somewhat prompt operation. Dr. Packard saw the case with me. As I recollect, the child walked to my office, which was about one-quarter of a mile from her home, on Friday. The symptoms, however, were so marked, and the tumor so distinct, that I made the diagnosis there and sent her home. On Saturday night, in consultation, my diagnosis was confirmed, and the operation was done on Sunday. The omentum was rolled up like a mass of beefsteak, as big as my hand, and adherent over almost the whole anterior abdominal wall. These adhesions undoubtedly produced the shock which caused the death. What has most impressed me in appendicitis is, that I have never yet seen two cases alike, even in their main points. One can never tell when cutting what he is going to find, or the extent of operation he will have to perform.

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GASTROTOMY FOR FOREIGN GROWTH, WITH REPORT OF A CASE.

C. B. LYMAN, M. D., DENVER, COLO.

The term gastrotomy is used to define those cases where an incision is made into and through the stomach walls for one purpose and another, the opening being immediately closed afterwards, as opposed to gastrostomy, the making of a more or less permanent fistula. All authorities say that the indications for this operation are: First, for the removal of foreign bodies which have been swallowed and which are too large to pass out of the cavity of the stomach. Theoretically, any body which can enter the stomach can escape from the pylorus, but practically such is not the case. Second, for the removal of foreign bodies which have been swallowed, and which have lodged in the lower end of the oesophagus. Third, as a preliminary step before doing a dilatation of the pylorus or cardiac orifice. There is no mention made anywhere of the fact that the operation may be required for the removal of a foreign growth springing from the stomach walls.

Much has been written concerning the operation for the removal of foreign bodies from the stomach; several have made a collection of all of the cases reported up to the present time, the most complete article probably being that of Dr. M. H. Richardson, of Boston, in the Boston Medical and Surgical Journal for December 16, 1886. He collected reports of thirty-three cases, twenty-three of which were well authenticated, and ten were doubtful. Of these, twenty-six recovered, four died, and in three the result was doubtful. Since that time eight cases have been added to the list, of which six made a recovery, one died, and in one the result was doubtful. The first of these operations, and the first of which any record can be found, was done in Prague, in 1602, for the removal of a knife which had been swallowed. The seventeenth century furnished us with three cases; the next century furnished us with two, and up to the year 1880, only sixteen cases had been reported. During the last fifteen years these

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cases have been more frequent, and have numbered twenty-two. The articles removed were of a great variety, the most common being knives, forks, and hair-balls.

The only case reported up to date of a gastrotomy done for the removal of a foreign growth, was reported by Chaput, in Le Bulletin Medical, Paris, June 3, 1894. This was done in the case of a patient aged 64, for the removal of what proved to be a pedunculated adenoma, which had given rise to symptoms of gastric carcinoma.

In most of the cases of carcinoma of the stomach the seat of the disease is at the pylorus, and when operative measures are demanded, one of three procedures is usually selected. When there are symptoms of stenosis, and it is desired simply to relieve those symptoms without any hope of making a permanent cure, gastrotomy is sometimes done in order that the stricture may be dilated, and literature abounds in the reports of cases of this nature. I have found reported about seventy-five cases of this kind.

The favorite procedure of the day is that of gastro-enterostomy, a new opening being made from the stomach into the duodenum outside the limits of the disease. During the last few years this operation has been much done by means of suture, or by the use of some one of the various mechanical devices, the Murphy button being perhaps the most popular, which method I have used in several cases.

When the disease has not progressed too far we can make an effort to remove the growth entirely by the operation of pylorectomy, so much advised and done by the German surgeons. There is a class of cases, however, where the disease makes its appearance in other parts of the stomach walls, and in these cases there is nothing which can be done in the way of a radical operation, except to do an excision of that portion of the stomach walls which is involved. If the disease chance to be on the posterior wall of the stomach, this will not be at all easy to do. A very few cases are reported, and the results have been in most cases rapidly fatal.

The case which I have to report is alike peculiar and interesting. The patient had, as you will see when I come to the history, all of the symptoms of carcinoma, and it was pre-

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sumably of the pylorus. The operation was undertaken with the idea of doing either a gastro-enterostomy or a pylorectomy, but when the abdomen was opened conditions presented themselves which were very different from what was expected. We had the stomach walls infiltrated over a very large area with the carcinomatous growth, and also a large mass of the malignant growth completely filling the cavity of the stomach.

A resection of the stomach walls was impossible, on account of the extent of the disease. The question which presented itself was to at least give the patient relief from his symptoms, and possibly prolong his life. A gastrotomy was decided upon as giving the only chance for removal of the growth, and it was therefore done.

Report of case: Mr. H. L.; born in this country; aged 60; a miner employed in one of the mines at Leadville, Colorado. He has been employed as a miner for twenty-eight years, five years of which have been spent in Leadville. He has had no illness of any importance previous to the present one. His father died of "jaundice," cause unknown, and he does not know how long he was sick. His mother died of typhoid fever. His uncles and aunts all lived to good old age, all dying when over 65 years of age. A half-sister has at the present time a tumor, but he is ignorant as to the character of it, and does not know in what part of the body it is located. Seven months ago he noticed that he had occasional attacks of vomiting, coming on shortly after meals, the attacks coming on every two or three days. The vomitus consisted of what food had been taken, together with some mucus. He never vomited any blood. The attacks of vomiting increased in frequency, and with it came such a loss of strength that he was obliged to give up his work six months ago, or one month after he first noticed the symptom of vomiting. Two months after the beginning of symptoms, he began to have occasional pain in the epigastrium, which became constant in character; but there would be times when the pain would be much more severe than at others. These exacerbations of pain would come on especially at night, and during the last two months have been so severe that they would interfere with his sleep,

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and he has been obliged to take opiates to quiet the pain. The vomiting has continued, and at the present time he vomits almost everything taken into the stomach. The pain is severe and constant; the pain is aggravated when food or drink is taken into the stomach. One year ago his weight was 140 pounds; now he weighs only 100 pounds. He has extreme constipation; the bowels move only once in five or six days, and then only with very great difficulty. His attending physicians could not agree on a diagnosis, so he was sent to Denver. I saw him, and placed him in St. Joseph's Hospital, on December 29, 1895, at which time I obtained the above history. An examination on this date showed him to be very much emaciated and anaemic; the eyes were sunken, the belly was flat, and he had a decidedly cachectic appearance. He was not confined to his bed, but was up and around his room. There was tenderness in the epigastrium and hypogastrium; the liver was normal in size. A hard mass could be felt in the abdomen, the lower border being about one and a half inches above and to the left of the umbilicus. This mass seemed to extend upwards, was freely movable, entirely smooth in outline, and apparently the size of a new-born babe's head. Percussion gave a distinctly tympanitic note over the mass, which had led the physicians in Leadville to say that it was a "gaseous" tumor; pressure over the mass gave distinct pain. The kidneys and spleen were of normal size.

He was given large doses of sulphate of magnesia and enemata, which produced several evacuations of the bowels, and another examination was made afterwards. This examination led me to believe that the mass was not so large as I had supposed on the previous day; it seemed to be situated nearer the ensiform cartilage, was freely movable, was still tympanitic, and tender to manipulation. A diagnosis was then made of a gastric tumor, probably carcinomatous in character. The patient was very desirous of being operated on, as he said that life was not worth living in his present condition. I therefore decided to make at least an exploratory operation. The operation was done on December 31, 1895, with the assistance of Dr. L. E. Lemen. The patient was prepared for the operation by having had given to him an enema, and having had the

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stomach washed out with a solution of boracic acid. While washing out the stomach, it was found that only a very small quantity of fluid could be introduced, and that the end of the tube came against some obstruction after it had passed the cardiac orifice. Strychnine was administered freely, and chloroform administered, but as the patient did not do well under it, ether was substituted. A median incision was made from the ensiform cartilage to the umbilicus; the abdominal cavity was thoroughly explored with the hand. Nothing was found, except in the case of the stomach, which felt like a hard ball about the size of a new-born babe's head. The stomach was freely movable; the outer wall was smooth and normal in appearance. The stomach was so freely movable that almost the entire organ could be delivered outside the abdominal wound. When this was done, it was found that the cavity of the stomach was apparently filled completely by a hard, solid mass, regular in outline. The anterior wall of the stomach was freely movable over the mass, and the mass was apparently attached to the posterior wall of the stomach. It was then decided to open the stomach for exploration, and if possible, for removal of the growth. An incision was made in the anterior wall about five and a half inches long. It was found that the mass was attached to the posterior wall by a pedicle which measured about three inches in thickness, and the mass was about five inches in diameter in every direction. The point of attachment was about two and a half inches from the pylorus. The pyloric and cardiac orifices were normal in size. The posterior wall of the stomach was infiltrated with the new growth from a point about three-fourths of an inch from the pylorus, nearly to the cardiac orifice. There was no ulceration of the mucous membrane at any point. The growth was smooth on its surface; the gastric membrane was congested throughout. It was decided to remove the growth at the level of the gastric membrane. The pedicle was transfixed with a large pedicle needle carrying large sized silk thread. The transfixion was made on a level with the lining of the stomach. The pedicle was litigated in two sections. The growth was then enucleated with the fingers instead of using a knife or the scissors. There was scarcely any hemorrhage;

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a few oozing points were touched with the cautery; the base of the growth was also thoroughly cauterized; the cavity of the stomach was flushed out. The incision in the stomach walls was closed with an interrupted Lembert suture of very fine silk. Outside of this layer of sutures was placed another layer, this being a continuous Lembert with larger sized silk. The surface of the stomach was then flushed with salt solution and the organ was then replaced within the abdominal cavity. The abdominal incision was now closed with silkworm gut sutures, and the usual dressings applied; time of operation, fifty minutes. Strychnine was administered freely during the operation. There was no sign of shock, and the patient recovered from the anaesthetic quickly. At 6 p. m., temperature 98.5, pulse 104, of good quality; some pain over seat of abdominal wound; nourishment was given entirely by the rectum, consisting of peptonized milk, whites of eggs and whiskey; strychnine was administered freely.

January 1—11 a. m.—Pulse 120, and of fair quality only; temperature, 97.8; there had been a slight amount of vomiting through the night; some tenderness over the epigastric region; nourishment and strychnine continued; 4 p. m., no vomiting through the day; pulse 124; temperature 98.2.

January 2—11 a. m.—Slight nausea; temperature 97.7; pulse 130, thready; slept five hours during the night; cold sweat; tenderness, but no pain; 6 p. m., vomited a small quantity of frothy material during the day; restless; some pain over wound; temperature 99.8; pulse 126; the bowels were cleaned out with a large enemata; was allowed a little ice to hold in the mouth.

January 3—10 a. m.—Pulse 118; temperature 98.4; complains of an empty feeling in the stomach, and asks for something to eat; does not retain all of the nutrient enemata; restless during the night, and was given a hypodermic injection of morphia, one-quarter grain.

January 4—The rectum would not retain enamata any longer, so nourishment was given by the mouth every three hours, consisting of peptonized milk and whites of eggs; morning temperature, 98; evening, 99; pulse varied from 110 to 118, and was of fair quality; no pain or distress in the region of the stomach.

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January 5—Retained all of the nourishment given by the stomach; had four operations from the bowels during the night; has a slight cough.

January 10—Abdominal wound dressed, stitches removed; union complete; amount of nourishment has been gradually increased, until now he is taking the whites of ten eggs and one quart of milk during twenty-four hours; strychnine has been omitted; he got up out of bed last night and went to the closet.

January 29—The course of the case after the first dressing was not marked by anything out of the ordinary line. He was allowed out of bed, was about the hospital, and has been taking semi-solid food, which did not cause any unpleasant symptoms.

January 30—Last night was taken with very severe pain in the right leg, extending from the groin down; the leg is very much swollen from the toes to the groin; very tender along the course of the femoral vein; foot somewhat blue; temperature 101; pulse 125; the leg was elevated and wrapped in cotton; hot water bottles were applied about the leg; whiskey and strychnine were given freely. At 6 p. m., temperature 102.5; pulse 130; there is slight delirium, and the leg is in the same condition as in the morning.

Died at 11 p. m. No autopsy was made, as the family would not allow it. The tumor was sent to Dr. Lobingier for microscopical examination, who reported it to be an adeno-carcinoma.

DISCUSSION.

Dr. H. G. Wetherill—In December last I heard in the Philadelphia Obstetric Society, a discussion of a paper, read by Dr. William M. Polk, of New York, on the treatment of pelvic suppurations. He advocated the vaginal puncture of abscesses, and the removal of tubal abscesses and pelvic growths through the vagina. But the interesting point in connection with Dr. Lyman's paper is a point which was made by Dr. Ashurst, of Philadelphia, and a point which I find is not alluded to, and, I believe, is not generally understood. Dr. Ashurst is not a gynecologist, and did not undertake or pre-

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tend to discuss that question from the gynecological standpoint. He discussed it simply from the standpoint of a general surgeon, and he made this point in favor of pelvic drainage: that the lower down in the abdominal cavity the incision, the less the risk was likely to be; that the mortality of abdominal operations was in direct proportion to the proximity to the diaphragm, and that incisions into the upper abdominal cavity, near the ensiform cartilage, of the same length and under the same conditions, were a great deal more dangerous to life than similar incisions in the lower portion of the abdominal cavity. As I say to you, this point had never been brought to my attention. The doctor also said that he had investigated it with a great deal of care, and he believed that it was an established fact. Mr. President, I think we ought to congratulate Dr. Lyman upon the courage which prompted him to go on with this case; and as one of my friends in the East used to say, "while the patient succumbed," the operation was certainly "a brilliant success."

Dr. C. A. Powers—While this may be a little diversion from the subject of Dr. Lyman's paper, I would like to know if Dr. Wetherill would lead us to believe that simple abdominal incisions are fraught with greater danger in the upper part of the median line of the abdomen than in the lower; that is to say, simple exploratory incisions two or three inches in length are attended with more risk in the upper abdomen than in the lower? Perhaps I did not get Dr. Wetherill's point exactly as he intended it.

Dr. H. G. Wetherill—In answer to Dr. Powers' question, I have only to say that the matter was as new and as entirely unknown to me as it was to most every one who was present at this society meeting. It was, as I have stated, a point presented by Dr. Ashurst, which he claimed to have investigated. I do not claim any responsibility for it, and do not say that it is true. I simply say that statement was made by Dr. Ashurst at that time, and he claimed it to be true. He did not undertake to explain it. He did not undertake to give any reason why it should be so. He simply said it was so, and had demonstrated it to his entire satisfaction.

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SYMPOSIUM ON INTESTINAL OBSTRUCTION.

FORMS AND CAUSES.

DR. O. J. PFEIFFER, DENVER, COLO.
DR. F. H. M'NAUGHT, DENVER, COLO.

Dr. Pfeiffer—Intestinal obstruction is not equivalent to stoppage of the bowels.

Intestinal obstruction means more than stoppage of bowels. Stoppage occurs in general peritonitis, with paralysis of the bowels, when there is no obstruction at all.

Conspicuous causes of intestinal obstruction are bands and cords, slits and pouches, invaginations, twists and knots, strictures, tumors, and abnormal contents.

Strangulation by bands and cords is first in importance as a cause of acute intestinal obstruction. These are most frequently due to pre-existing peritonitis and are either fibrous adhesions alone, or are formed by adherent appendages of the intestinal or genital tract.

In 101 cases, strangulation was due: To adhesions, 63 cases; vitelline remains, 21 cases; adherent appendix, 6 cases; mesenteric and omental belts, 6 cases; peritoneal pouches and openings, 3 cases; adherent tube, 1 case; pedunculate tumor, 1 case.

Intussusception from peristaltic contraction is always below; the contracted portion of intestine forces itself into the passive intestine below, and hence is descending in location.

Varieties: Small intestine into itself, into cœcum, or into colon; colon into itself or rectum; rectum into itself.

Ileo-cœcal or ileo-colic, 75%; enteric, 12%; rectal, 8%; colico rectal, 5%.

Twists and knots: Knots are so rare that they may be practically disregarded. Twists are due to constipation, hernia, adhesions from ovariotomy, violent exercise, diarrhœa, and irritating food.

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Seat of twist: Sigmoid flexure, 49%; ileo-cœcal, 29%; cœcum, 29%; small intestine, 13%; ascending colon, 5%; colon, 2%; descending colon, 2%. 87% are in the large intestine.

Abnormal contents: Murphy button; fecal concretion; inspissated feces and foreign bodies; biliary and intestinal calculi; shells and date seeds.

Gall stone may cause obstruction, not by its mechanical resistence in the bowel, but by the lesion it causes in getting into the bowel, the lesion causing a general peritonitis which results in stoppage. Obstruction from fecal matter gives rise to a tumor in about one half the cases. The latter may occupy the entire abdomen, the left lumbar region, the left hypochondrium, left iliac fossa, right side or right iliac fossa. Obstruction may last from two weeks to four months, with recovery.

Intestinal calculi are too rare to be regarded.

Strictures and tumors: Malignant disease and stricture of the intestine, and abdominal tumors outside of the intestines, may be causes of acute intestinal obstruction.

Published experience of past few years shows that of 100 cases of intestinal obstruction, strangulation will occur in 37%; intussusception in 34%; twist in 15%; gall stones in 8%; and stricture or tumor in 6%.

Location: Strangulation, in large intestine 7%, small intestine 72%; intussusception, large intestine 51%, small intestine 8%; twist, large intestine 30%, small intestine 5%; gall stones, small intestine, 14%; strictures and tumor, large intestine 12%, small intestine 1%.

Dr. F. H. McNaught—Dr. Pfeiffer has so thoroughly discussed the subject that very little remains to be said; yet, it is possible that some good may come from an expression of views on the doctor's remarks.

The doctor implies that the greater number of cases of intestinal obstructions are due to peritonitis.

I would not care to criticise the remarks, yet I think it questionable whether he is warranted in using the expression peritonitis as the cause of obstruction, more especially if said obstruction follows adhesion or bands of plastic exudate.

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Peritonitis implies that a true inflammatory action has taken place. In very few cases of laparotomy for uterine or intestinal disease do we have complete recovery following without some adhesion of the intestinal or uterine tract; said adhesions may follow an undue handling of the contents of the peritoneal cavity, or traumatism upon the same. Often these adhesions are demanded, and a plastic exudate encouraged by scarification of the parts. Such plastic exudate takes place following intestinal anastomosis or fixation of some organ of the abdominal cavity.

Now, when such a condition is intentionally brought about, it is not expected that a true inflammatory condition is necessary; hence the questionableness of the term peritonitis.

It cannot be questioned that the great cause of intestinal obstruction is due to adhesion, and I think the future will present to us a greater number of cases of intestinal obstructions than the past, on account of the daily invasion of the peritoneal cavity by the abdominal surgeon and gynæcologist.

These exudates at first simply produce fixation of some point in the intestinal tract. From continued paristalsis these exudates—at first broad and short—at last become enlongated and tense, forming a bridge over or under which an intestinal loop may pass and become constricted, producing true strangulation of the bowels.

Fitz, in 295 cases, gives 34% as due to bands or adhesions. It has also been demonstrated that these plastic exudates are especially noted in the right iliac region, in and about the vermiform appendix.

Another fruitful source of this condition is found in bands of omentum and mesentery. In about 10% of all cases of intestinal obstruction the cause is found in these bands. The passage of some portion of the bowels into normal peritoneal openings often produces strangulation—the so-called internal hernia.

It is well we should take into consideration the difference between strangulation and obstruction. In strangulation we are to understand that the blood supply is interfered with, and if relief is not obtained we must soon have sphacelus or death of the parts; whereas, in obstruction proper, due to fecal

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matter or foreign substances in the lumen of the bowels, we may have complete obstruction without strangulation.

In acute strangulation operative measures are demanded as soon as the condition is recognized, while in obstruction proper it is not necessary that we should always expedite an operation.

One-third of all our cases of strangulation are due to intussusception, and the greater number of the cases are also to be found at the right iliac region. Many cases of intestinal lesion to be found in children are due to this cause, and it is very questionable, if a greater number of necropsies were obtained, whether or not we should not find this the cause of death other than the recorded cause.

Dr. Kelsey lately reported a case where he operated upon a child three months old for intussusception, and recovery took place; and a letter from Frederick Treves, of London, says this is the first case on record where a child so young has recovered from the operation.

Treves is also recorded as saying that an early operation is the only practical treatment of the case.

Volvulus, kinks, or twists are also frequent causes of intestinal obstructions; usually found in left iliac region. Loose mesentery attachment, peculiar shape of the bowels, and the liability to an accumulation of fecal matter at this point, usually explains the cause of this condition. It is a condition rarely found in the small intestine, or the right peritoneal cavity.

INTESTINAL OBSTRUCTION IN CHILDREN.

DR. S. G. BONNEY, DENVER, COLO.

As nearly all of the varieties of intestinal obstruction that occur in the adult are occasionally found in children, a strict interpretation of the subject that has been assigned to me would involve the consideration of the various forms and causes, the symptoms, diagnosis, medical management, and surgical treatment. This is obviously far beyond the scope of the present discussion, and it is wise, therefore, for me to limit

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my remarks strictly to that form of acute intestinal obstruction which is so frequently met with in childhood, which possesses the most practical importance to the physician, and which is perhaps one of the most dangerous accidents to which a child may be liable. I refer to intussusception, and with your permission, what little I have to say will be strictly with reference to this condition.

My views are based upon the limited amount of reading that I have been permitted to do, and somewhat upon my own experience. In reviewing the literature upon this subject, I have been very much impressed with the contributions of Drs. Fitz and Leichtenstern. I was interested to read the elaborate article of Dr. Fitz at the time of its publication in 1888, and have found from subsequent investigation that the later writers are basing their conclusions almost entirely upon the statistics contained therein. He reports 295 cases of acute intestinal obstruction, with ninety-five of intussusception, collaborated from the French, English and German authors. Each case was subjected to a rigid investigation, only those cases being accepted as intussusception which were verified by laparotomy, autopsy or by passage of the slough. The frequency with which this condition exists is estimated variously by different writers at from about 32% to 40% of all cases of obstruction. If we exclude those forms of intestinal obstruction which are dependent upon abnormal contents or tumors, the percentage slightly exceeds 40%. The relative frequency of intussusception in children is shown by the fact that about 34% occur under one year of life, and 56% under ten years. The location of the invagination has been found to exist principally in the region of the cœcum. Fitz reports the cœcum to be involved in 75%, the rectum in 8%, the ileum in 12%, and the colon and rectum together in 5%. Dr. Carmichael states that 90% of all cases of intussusception occur in the region of the cœcum. Others have spoken of it as from 60% to 70%. It is interesting to notice that while the site of the original invagination is on the right side, usually, and in the ileo-cœcal region, the tumor which results is usually found upon the left side, which is to be explained as follows: In the majority of cases the ileo-cœcal valve is pushed forward by the small intestine into the

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cœcum, and thence into the colon; the invagination taking place purely at the expense of the colon. Thus the location of the mass will be frequently upon the left side before the condition will have attained a sufficient degree to render palpable a tumor. The invaginated portion may extend all the way from a few inches to six feet. In fact, the ileo-cœcal valve is sometimes found protruding from the rectum. In a comparatively rare number of cases the small intestine slips by the ileo-cœcal valve, and the invagination occurs at the expense of the ileum. The symptoms of chief importance are pain, constipation, with bloody stools, nausea and vomiting. The presence of a tumor adds corroborative evidence of the existence of the condition. Of minor importance are tympany, fever and tenesmus. The pain is usually severe, frequently of sudden onset, and is paroxysmal in character. It is not present in all cases, the frequency of its occurrence being about 70%. It is of practical interest to note that in the early part of the case, during the intervals between the paroxysms, the child may appear perfectly well, and be willing to take food, thus permitting of possible errors of diagnosis at this time. Later, the pain becomes continuous, face becomes anxious, features pinched, and collapse ensues. Nausea and vomiting occur in about two-thirds of all cases. Usually this symptom appears upon the first day, and is rarely fecal. In this the condition differs from strangulation, in which it is not uncommon to get stercoraceous vomiting. In those cases in intussusception in which fecal vomiting does exist, it does not usually occur until on or about the fourth day. The proportion of cases in which it has been found by various writers to be present is about one-tenth. The bloody stools occur in about three-fifths of the cases; as a rule they appear upon the first day. The intussusception may be preceded by either diarrhoea or constipation. After the pain has set in the discharges are bloody, and later consist simply of bloody mucus. Tumor occurs in but little over two-thirds of the cases. In one-third of the cases in which it does exist, it has been found to appear on the first day—rarely later than the third; usually on the first or second day. In about one-third of the cases the tumor may be discerned simply from abdominal examination. In a little less than one-third of the

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cases it can be found solely on rectal examination. It is more frequently found upon the left side, and is excessively tender, in contra-distinction to the tumor of fecal impaction, which is usually on the right side, and rarely sensitive, even under deep pressure. The tenesmus occurs in about one-third of the cases, and in a large number upon the second day. Tympany is one of the least important symptoms of intussusception. It is not present in quite one-fourth of the cases, and when it does occur, usually not until on or after the third day. As a matter of fact, the right side of the abdomen is frequently depressed. It has been spoken of as the characteristic depression of intussusception upon the right side, due to the displacement of the cœcum. Fever is rarely if ever present at the beginning, at which time the temperature is often subnormal. It may appear, however, after two or three days. The diagnosis of intussusception is usually easy, but it is well to bear in mind the possibility of confounding this with such conditions as colic, appendicitis, fecal impaction, strangulation, and hernia. The points of differential diagnosis are too well recognized generally to demand repetition. It is well to emphasize the importance of a careful examination of the abdomen, and by the rectum, in each case.

As regards the prognosis, the statistics of Drs. Fitz and Leichtenstern show approximately the same results. In the report of Leichtenstern the mortality is placed at 73% without operation. He strangely gets the same rate in those cases that have been subjected to surgical interference. In the table of Fitz, the result is still more unfortunate. The mortality rate in his report, without operation, is 69%; with operation, 83%. It is well to remember that these cases occasionally get well themselves—either by a spontaneous reduction of the invagination, or by the formation and expulsion of the slough. The recognition of this fact is of considerable importance in the consideration of the treatment of any individual case.

I will state my views with reference to the treatment very briefly. I should suggest, first, the wisdom of explaining to the family the nature of the condition, the possibilities involved, and the responsibility entailed, with a request for competent counsel. I believe it to be the duty of the physician to

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summon a surgeon, not so much with a view to immediate surgical interference, but rather to permit of an early and comprehensive consideration of the several features of the case, and to be prepared for operation without delay, as the exigencies of the situation may require. I would suggest the giving, as early as possible, of a copious injection of normal salt solution (numerous other liquids are recommended), the child being first put upon its back with the hips elevated. Gentle abdominal taxis should be combined with this. If necessary, the inverted position may be assumed. The height of the column of water should be from six to ten feet above the hips. There should be a catheter used, or a rectal tube inserted as near as possible to the site of the invagination, in order that the full force of the current may be expended directly upon the apex of the intussusception, and not upon the intestinal wall. I should recommend an anæsthetic for this procedure, unless especially contraindicated. In case of failure to reduce the invagination, the physician and surgeon have the alternative of operating or of leaving the case to itself—of assuming the grave responsibilities of operation with its established uncertainty of favorable results, or of intrusting the patient to the doubtful chance of a spontaneous cure of the constriction. Certainly the statistics of published cases thus far, that I have been able to see, do not lend very much encouragement to the performance of laparotomy. At the same time, if the operation is to be performed at all, I should suggest that the surgeon be free to act at the time when the patient is still under the initial anæsthetic. It is a question which can be properly laid before the family at the time, and opportunity thus allowed them of assuming a share, at least, of the serious responsibility. Of course, the question of surgical interference will have to be decided largely upon its seeming advisability in each individual case.

I will recite briefly the history of an interesting case that came under my observation about three years ago. The patient was a boy one year old. He was seen by me about thirty-six hours after the onset of the affection. The following symptoms were exhibited: Pain, vomiting, bloody stools, and tenesmus; the face was pale, features pinched, pulse rather weak and rapid; temperature, 100; sausage-shaped tumor to the left

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and slightly above umbilicus. Appreciating the fact that the case was an urgent one, and feeling compelled to adopt immediate measures, I did not send for counsel, but after stimulation by whiskey hypodermically, tried the method of reducing the invagination by the warm water injections and abdominal taxis. The child was placed upon its back with the hips considerably elevated, and a large quantity of water was slowly introduced by means of an ordinary fountain syringe at a height of about two and a half to three feet. The water was freely expelled at intervals; all efforts to reduce the invagination were unavailing. The child was then placed in the inverted position, the father holding him suspended by the ankles, the syringe was elevated still more, and deep abdominal taxis used with both hands over the site of the tumor. Considerably to my surprise and delight, about ten or fifteen minutes of this procedure sufficed to produce a complete reduction of the constriction, which was of course followed by perfect recovery of the child. I mention the case simply as a matter of interest.

MEDICAL MANAGEMENT.

DR. H. W. M'LAUTHLIN, DENVER, COLO.
DR. H. R. BULL, GRAND JUNCTION, COLO.

Dr. McLauthlin—Although it has been assigned me to speak of the medical management of intestinal obstruction, I wish it distinctly understood that I am not an advocate of medical management to the exclusion of surgery. In this subject, as in finances, I believe in a double standard, the ratio to be fixed in each individual case. I believe the medical management should be ever ready to call upon surgery if the case becomes serious or fails to improve under medicinal treatment alone; that by no means should the physician wait until he has demonstrated that medicinal treatment alone will not save the patient, before calling the surgeon, for then surgical treatment will also be too late for the best results.

Medical treatment, to be of any service, must be prompt and energetic. The consensus of medical opinion, at least,

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seems to place opium, in the form of hypodermic injections of morphine, at the head of the list for most acute cases of intestinal obstruction. Opium relieves pain, quiets vomiting, lessens danger of collapse, lessens peristaltic action, and so lessens danger of injury to the bowel; reduces inflammation and gives the bowel a chance to escape from a constriction, or an invagination to become untwisted. Often, under the influence of opium, the bowels move spontaneously, while this would never have happened under the influence of cathartics, and if so, attended with great danger.

The value of large enemata of warm water frequently repeated and conscientiously given is recognized by all. Care must be taken not to have the pressure too great, and to remember the normal capacity of the colon; otherwise the bowel may be ruptured. The capacity of the adult colon is usually about six quarts; but may be considerably less. The injection of air into the bowel is also successful at times, and the generation of gas within the bowel has been used successfully, but is hardly to be recommended. After forty-eight, or at most seventy-two hours, this treatment avails but little, because adhesions have occurred as the result of inflammation. This also applies to abdominal massage, or to shaking the patient in an inverted position. The enemata should be given with the patient under an anæsthetic, preferably, and with the hips raised.

Attention is called to the advantage of stomach washing in cases marked by excessive or fecal vomiting. It can be resorted to four or five times a day, and not only relieves vomiting and frees the stomach from its abnormal contents, but relieves distension and peristaltic action of the bowel above the point of obstruction.

For the tympany which is so commonly present, if not severe, turpentine stupes may be used. It has been suggested if the tympany is very severe to aspirate the bowel with a hypodermic needle. This procedure often relieves considerably, but there is danger of peritonitis being set up by some contents of the bowel escaping.

In reference to purgatives, they are not to be used generally if inflammation is present; but in some cases, especially in fecal obstruction, small doses of castor oil, in the form of an

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emulsion, with a little turpentine, and frequently repeated, are recommended. Sometimes it is necessary to mechanically remove fecal masses from the bowel. It is never safe to delay longer than forty-eight, or at most seventy-two hours, before operating, and it should be done sooner if the above treatment fails to show an improvement, and in some violent cases immediate operation offers the only chance for life.

The diet in acute cases is important. On account of the vomiting and general irritability of the stomach it is generally better to rely upon rectal alimentation, giving by the stomach only small sips of carbonated water or champagne, or brandy and water iced. After an impaction is relieved it is important to prevent its recurrence as far as possible, by attention to diet, exercise and abdominal massage and the giving of tonics, especially strychnine to improve the tonicity of the bowel.

In chronic cases of intestinal obstruction the occurrence of acute exacerbations should be prevented as far as possible by attention to diet, and especially the avoidance of food which tends to clog or which produces much waste. The habitual use of a laxative mineral water is often beneficial. As many of these chronic cases obtain considerable relief from daily enemata of water, it is well to remember that the use of olive oil, say eight ounces, in place of water, at night, would probably keep the bowel in a more healthy condition, while it is also an aid to nutrition.

Dr. Bull—It is with some hesitation that I attempt to outline the treatment of intestinal obstruction from a medical standpoint, in view of the more certain and brilliant results obtained by modern surgery, and because I have firm convictions that it is in surgery rather than in medicine that the relief of the condition must be sought in a large proportion of cases.

Nevertheless, if we may include also what may be termed the mechanical treatment and assume that the physician is equally a surgeon, there is a place for medicinal treatment in some of these cases—a field which is more limited or more extended according to our ability to accurately diagnose the cause of obstruction. The consideration of the treatment of obstruction from external hernias has no place in this paper, and we

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will refer to the surgeon immediately our cases of volvulus or other forms of obstruction accompanied by a stercoraceous vomiting as having no place in medicinal treatment.

We encounter but few conditions which give us more anxiety. Summoned, perhaps, some hours after the symptoms of obstruction have been manifest, we find the patient urgently solicitous for some purgitive that will open his bowels, and usually he has taken physic freely before the arrival of the physician. I believe it to be an axiom in managing complete intestinal obstructions that purgatives are absolutely contra-indicated. These agents only cause additional irritation, and add to the nausea, tenesmus, and vomiting. Purgatives will force down still further an invaginated portion of bowel, and in any case add to the exhaustion of the strength of the patient. The great medicinal remedy in bowel obstruction is opium, pushed in moderate and repeated doses if necessary. Its use arrests the pain, quiets the vomiting, and relieves the violent peristalsis. No special dose can be prescribed. The remedy must be pushed until the pain is relieved, but not to the stage of narcosis. It is best given hypodermically; but if for any reason it cannot be so given, its use by suppository may be resorted to, the stomach not being in a condition for its absorbtion, even if it could be retained. Opium thus given lessens the danger of death by collapse. It gives us time to perfect, if possible, our diagnosis and to consider what had better be done next; and with a proper appreciation of the making of certain symptoms by the opiate, it leaves the parts in better condition for operative interference, which in many cases offers the only hope of relief. Patients suffering from acute obstruction should avoid taking either food or drink. There is little or no absorption under these circumstances, and the accumulation of fluids above the obstruction will not fail to aggravate the symptoms, exhausting the patient by causing greater distension of the bowels and more violent vomiting. Assuming that we can make a diagnosis of the cause of the obstruction with reasonable accuracy, we may consider briefly the treatment of obstructions from malignant growths, foreign bodies, intussusception and intestinal paralysis as offering a more or less limited field for medicinal treatment. In the case of obstruction from malignant growth, the object being to preserve life as

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long and comfortably as possible, much relief may be obtained by stomach washing. This is not to be recommended in the acute forms of obstruction, as it causes us to lose valuable time on a method which has no curative value. By stomach washings the stomach may be kept in a condition to absorb fluids, and when this is associated with careful rectal alimentation, life may be prolonged for weeks. With these three resources—lavage, rectal alimentation, and opium—I have succeeded in prolonging in comparative comfort the life of a patient for a period of four weeks after there was complete obstruction of the bowel, and where later the autopsy confirmed the diagnosis of scirrhus cancer of the pylorus. When a foreign body has been swallowed, and especially if it have sharp points or irregular surface, the proper management is to order the patient to diet on food leaving a large residue in the bowel. The potato diet has been warmly advocated and is probably of value by protecting the mucous surfaces and by distending the bowel. The practice of giving purgatives under such circumstances, as is often done by the laity, is much more liable to cause injury. If, after a foreign body has been swallowed, symptoms of obstruction come on, and the foreign body cannot be reached through the rectum, a laparotomy is the only hope for the patient. In the treatment of intussusception or invagination, the immediate use of opium in sufficient or repeated doses by hypodermic injection is of prime importance in preventing shock and further invagination. A large fountain syringe or pitcher with syphon tube should now be filled with warm water and made ready for distending the colon. The rectal tube may be tightly wound in the middle with a bandage sufficient to make compression by firm pressure and the tube introduced up to the shoulder made by the bandage, thus preventing the escape of water round the tube. The patient's hips being well elevated, or the patient inverted, the colon is slowly distended by gradually elevating the douche bag to a height of six or eight, or even twelve to fifteen feet. Gentle abdominal massage may be practiced during this distension of the colon, the movements being from the lower portion of the invaginated bowel upward. This bowel distension is best accomplished without an anaesthetic, in order that pain may warn us when to desist. As a further method, or in the event of failure of the above method,

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the injection of filtered air or gas has been warmly recommended. Air diffuses more readily than water, and may succeed in the reduction of an intussusception when simple flushing fails. It is common for physicians to have in their offices an air compressor with pressure gauge, for use with a set of spray tubes. By means of this instrument it is easy to distend the bowel by air and to know just how much pressure we are using. Twenty minutes' steady pressure and associated with gentle massage is as long as this method should be tried. These methods should be given one thorough trial—no more. If we fail in reducing the invaginated bowel, the case should be at once operated on.

I beg to report briefly two cases of intussusception which have occurred in my practice. The first was that of Mrs. C., a lady aged 58 years; while in good health and without any apparent cause except that she had been chronically constipated for many years she was seized with violent paroxysms of pain and vomiting. She was seen within two or three hours after the onset of her pain. Upon investigation the invaginated bowel could be plainly felt upon a rectal examination. Her pains were relieved by morphine given hypodermically; Her hips were well elevated, and with an ordinary Davidson syringe the bowel was flushed under pressure and reduced.

The second case was that of a boy eight years old whom I was attending through an attack of scarlatina last March. He had commenced to desquamate and was very restless. Upon turning in bed he complained of pain, which he referred to the umbilical region. He had not vomited when I saw him, and the mother had, on her own responsibility, given him a large dose of castor oil and was applying hot cloths vigorously. The precise nature of the case was doubtful at this time. The child was given an opiate, and hot applications were continued. The following morning, in company with Dr. John Gould, my consultant, we visited the case. We were informed that the oil had operated. In the left iliac region and extending downward was an elongated swelling. From the partly relaxed anus there was a discharge of mucus and blood, and we could plainly feel the invaginated bowel upon digital examination. The diagnosis could not well be doubted, nor could it be questioned that the unauthorized dose of castor oil had forced the

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invaginated portion further down. With much difficulty, and under the method previously given, we succeeded in reducing the invaginated bowel with the addition of manual pressure over the presenting part at the anus.

Intestinal paralysis causing bowel obstruction is a condition which is not infrequently met with following injuries to the abdomen from traumatisms, or after tedious laparotomies. Its onset may be sudden and accompanied with great bowel distension, with embarrassed heart action and labored respiration. This condition will frequently, unless relieved, come to a fatal issue, death being caused by septic absorption, exhaustion, or peritonitis. Under these conditions we have a very rapid pulse, vomiting of food and bilious bowel matter, and, moreover, there is absolute constipation. We find under these circumstances no marked tenderness over the bowels and no special alteration in the temperature. In treating the early stages of this condition, we may make an exception to our general rule in obstruction, and may with propriety administer an active saline. But if there is great distension, or severe vomiting, neither salines nor anything else by the mouth is indicated. Small quantities of morphine may be administered to quiet pain, if severe, but the one great remedy for this condition is strychnine, used hypodermically in decided doses up to the fifteenth or even tenth of a grain, pushed to the point of muscular twitching. Meanwhile, the embarrassed heart and depressed general condition must be supported by free stimulation per rectum or hypodermically. The rectal tube may be used with advantage to draw off gas, and the use of stimulating enemas may be of service. Finally, as a last resort, where death seems imminent from the distension embarrassing the heart's action and respiration, aspiration of the bowel may be practiced with advantage and may save life.

These conditions of intestinal paralysis I have met with in practice, both from abdominal contusions and as a secondary condition following abdominal operations.

I beg in this connection to report briefly the following case, and if I overstep the strict medical treatment, I trust that the gentlemen who discuss the management from the standpoint of surgery will excuse me on the ground that I find it difficult to confine myself strictly to the limitations of the subject.

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The case of J. L., age 16, on whom I operated one year ago for suppurative appendicitis, on March 8, on the fifth day of his sickness. No difficulties were encountered. The abscess cavity was lightly packed with gauze and dressed in the usual manner, the gauze drain being removed on the third day. We secured primary union except at the lower edge of the wound where the drain was removed. The case progressed beautifully for twelve days, when, contrary to orders, the boy ate a hearty meal of heavy food, and paralysis of the bowels followed. There was absolute obstruction from this cause. The bowel distension became so great that the heart was greatly embarrassed and respiration superficial. The wound which had united so well became partly torn open. In spite of strychnia, stimulating enemas and supportive measures, the condition was unrelieved. Thinking that possibly there might be a secondary abscess, the old incision was reopened and careful search made, but everything was found in a healthy condition. The distended bowel bulged up into the wound. We had here a cavity within a cavity, as the old abscess walls shut off the general peritoneum. I made an incision into the bowel with a sharp bistoury. The amount of gas and fluid bowel contents which escaped, aided by gentle abdominal pressure, was enormous. As it was withdrawn the cyanosis cleared up. The pulse became again perceptible; the bowel was closed with Lembert sutures and the wound closed. The intestines under the freest possible exhibition of strychnia regained again their usual contractile power, and my patient made a slow but eventual recovery.

IN WHAT CLASS OF CASES AND AT WHAT TIME SHOULD SURGICAL INTERFERENCE BE CONSIDERED?

DR. C. A. POWERS, DENVER, COLO.
DR. W. W. GRANT, DENVER, COLO.

Dr. Powers—I beg to endorse most emphatically all that has been said by my predecessors. The unanimity with which they commend early surgical interference is certainly gratifying to those of us who deal with surgery. In deciding

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this very important point as to the time and class of cases in which surgical interference should be undertaken, or, as the programme says, "considered," many things have to be borne in mind. In general, the more acute the onset, the earlier the period at which the surgical interference must be made. In certain classes of cases there is practically, to my mind, no medical management. Certainly this would be so in the reduction en masse of an external hernia. Suppose a man to have a large external hernia: At the first appearance of this trouble, the hernia is reduced by taxis, but the symptoms of strangulation continue. In such a case there can be no question as to the immediate necessity for an operation. Such a case I have in mind, in which a man forty years of age had an inguinal hernia somewhat larger than one's fist; it was reduced with ease. The reduction was made not more than an hour after the appearance of the hernia; it was the first time that the patient had been subject to the condition. Some three hours later I saw the man in partial collapse, the pulse feeble and thready, the temperature subnormal; pain in the lower part of the abdomen; the face cyanotic; a delay of an hour was made; the abdomen was then opened and the hernial sac found at the internal inguinal ring. The hernia had been reduced en masse—operation followed by recovery.

In another class of cases, again, those in which the obstruction is due to bands, adhesions, kinks, twists, and the like, early operative interference is demanded.

We know that in about one-fourth of all cases of intestinal obstruction, the obstruction or strangulation is due to one of these causes. Here, again, there can be no medical management. I am excepting, if you please, volvulus, but including bands, the slipping of a knuckle of intestine under an adhesion, internal hernia (which is more common than we think), hernia in the foramen of Winslow, hernia into an opening in the mesentery either congenital or acquired. In these cases the onset is sudden—perhaps after a sudden strain, a lift, or a fall; the patient will complain of sharp, piercing, agonizing pain, the pulse will be rapid, temperature subnormal, the face pinched, anxious, the patient thirsty, the abdomen bathed in a cool, clammy perspiration, the urine very scanty. Here, again, we

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are not to delay long. I do not say that in every instance we are to proceed at once to the opening of the abdomen, but our delay is not to be long—not longer than a few hours. In this class of cases it sems to me that the less opium we use, the better will be the outcome. In these very acute cases opium tends to mask the symptoms. It gives the patient comfort; it makes him feel easier; he himself feels that he is getting better, and the attending physician or surgeon is apt to share in this delusion. A very small amount of morphine, just enough to dull the pain, is better than a large amount.

If we are called to a case of intestinal obstruction of an acute nature, it is our duty when first seeing the patient to examine him or her very carefully for all of the rarer forms of hernia—sciatic, perineal, obturator, pro-peritoneal, that above the crest of the ilium in the little triangular space whose name I forget at this time; for all of these we must examine carefully.

It is needless to say that the abdomen should be most carefully examined, and thoroughly. If the obstruction be in the small intestine, vomiting will be an early symptom and will be very persistent; the higher the obstruction in the small intestine, the earlier and more constant and more persistent will be the vomiting. Again, if the obstruction be in the small intestine, between its middle and the ilio-cœcal valve, the abdomen is apt to be rounded; flat at the sides, rounded in the center. That aids us a little in determining the nature of these sudden cases.

Constipation is very much of a guide; the more absolute the constipation, the earlier the time at which we must consider the question of surgical interference—and I lay stress upon the word "consider," because it is not in every case that we consider laparotomy that we carry it out. But where the obstruction is so absolute that no gas whatever escapes from the rectum—and this is a point which must be watched most carefully by the nurse—she must be instructed very carefully as to this—the more absolute this constipation, the earlier must we think of operative interference.

In general, as I have said, the more acute the onset, the earlier the time at which we must interfere.

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In chronic obstruction—that due to narrowing of the gut from pressure without or from a tumor in its own wall—we may be more deliberate; but here, to my mind, the surgeon is very frequently consulted too late. In case of cancer of the colon, or of any part of the rectum, if we are to relieve the patient by laparotomy, that must be done before the condition is so far advanced that the operative procedure itself will prove fatal.

Dr. Grant—I can add little, perhaps, to what has been so well said by my friends and colleagues in reference to the diseased conditions we are now considering. I consider that surgical interference is demanded in proportion to the urgency of the symptoms, the acuteness and urgency of the condition, ordinarily shown by obstinate constipation and generally by vomiting, although in obstruction of the large intestine vomiting is not so common a symptom, and sometimes is entirely absent. We have to contend most with those cases due to bands, adhesions, to Meckel's diverticulum, or constriction of the ileum, or, by a similar cause, the appendix. In these obstruction occurs usually suddenly, with marked and acute symptoms. In these cases there is no medical treatment, and nothing but the prompt interference of the surgeon gives these patients a chance of recovery. In certain malignant diseases, such as those of the pylorus, of the sigmoid flexure, or the rectum, we have more time for consideration. But it is a well established fact that the operation of pylorectomy would be to-day in better favor if the surgeon operated in these cases very much earlier than is now done. If he waits until the general condition of the patient is bad, and he is exhausted from want of food, then gastroenterostomy is the only operation that will afford even temporary relief. The cases which admit of more doubt as to surgical interference are those of intussusception. Many of these cases are treated very well with opium, absolute rest, and profuse enemata; yet, under the statement which has been made, the statistics reported, the mortality is very great from the medical treatment, and is great or greater from surgical interference; yet I apprehend that the bad results from the surgical treatment are due largely to this fact: that the physician has exhausted every means in his power, and has exhausted the patient before the surgeon is called to consider it.

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So I say that I can conceive of no class of cases of intestinal obstruction in which the services of the surgeon should not be demanded—in many cases promptly; in some, as I have stated, more time for deliberation can be taken; but I believe in these cases of intussusception, usually shown by tenesmus and mucobloody discharges, that if the physician, with the well known means recommended, does not succeed promptly—and I would say in twelve hours, or at most twenty-four—then laparotomy should be performed. The bowel is not difficult to reduce with prompt operation, and laparotomy is of itself not very dangerous. Therefore, in these cases, in my opinion, the attention of the surgeon is demanded much oftener and much more promptly than is usually believed, and better results will attest its wisdom. It should be remembered that the cases which recover with sloughing or unreduced bowel do badly afterwards; and this is an additional reason for surgical intervention. Obstruction from growths outside the intestine is gradual, and each case should be judged and treated by the conditions and indications peculiar to each. In a case very recently seen by me, there is occasional obstruction of the sigmoid flexure from advanced uterine carcinoma, and its extension to left broad ligament and tissues, involving the bowel. In such a case I advised inguinal colotomy, and the patient will die from obstruction sooner than from the disease, if it is not done. In all forms of strangulated hernia little time should be wasted in attempts at reduction. The earlier the operation, the more satisfactory the prognosis.

SURGICAL MANAGEMENT.

DR. F. N. COCHEMS, SALIDA, COLO.

While listening to the remarks made by the gentlemen on "The Medical Management of Acute Intestinal Obstruction," I have arrived at the conclusion that they have at least partially used up my subject, viz., "The Surgical Management."

The surgical management of any condition means the cure, or attempted cure, by manual operation. Therefore, I include in the surgical management such measures as the injection of

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water, air, hydrogen gas, etc., for attempted reduction of invaginated gut, irrigation of the stomach with mild antiseptic solutions after Kussmaul, taxis for the reduction of external hernia, and massage of the abdomen. However, I suppose that by the surgical management was meant the methods to be employed when in any case it has been decided to use the knife.

Now, as patients in these cases always suffer from more or less shock, and the temperature is often subnormal, it is wise to have the operating room quite warm; the field of operation necessarily sterilized. The instruments to be used should consist of those employed in any ordinary laparotomy, together with some of the mechanical appliances devised to facilitate the lateral, end-to-end, or end-to-side anastomosis of the intestine, such as Murphy's button, Senn's bone plates, etc.

If in any case, from all the signs and symptoms, the point of obstruction cannot be ascertained, then an incision should be made in the median line below the umbilicus, and at once large enough to admit the examining hand. With such an opening the surgeon can, if necessary, explore the entire abdomen. However, it may not be necessary to pass the hand into the abdomen if distended and congested bowels appear at the opening, for by carefully following these in the direction of greatest distension and congestion, one will sometimes quite easily locate the point of obstruction. If so favorable a condition is not found, it may be necessary to pass the fingers or hand along the areas where obstructions are most commonly found, such as the ileo-cœcal region, the promontory of the sacrum, the umbilical region, and the entire course of the large intestine.

If such manipulation does not locate this obstruction—and at times it will not—then the small intestine may have to be drawn out and replaced, inch by inch, beginning at the ileo-cœcal valve. This entails a great amount of shock, even when one is careful to keep all exposed intestine protected by hot wet sponges.

The distended intestine above the point of obstruction should be punctured to allow of the escape of the large amount of gas and fluid which has collected. This is often of as much importance as the relief of the obstruction itself.

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One should in all cases have a sufficient number of good assistants to facilitate the work. The case may be a simple one; again, it may be one of the most difficult in surgery.

Regarding the anæsthetic to be used, I think that unless decidedly contra-indicated, ether should be used. It is a stimulant to the heart; chloroform a cardiac depressant. It does not kill your patient, at least not on the table. Chloroform too often does, even when the patient's general condition was good previous to operation.

If, after the obstruction is found and relieved, gangrenous bowel is present, what is to be done?

Many methods are employed by various surgeons. I will refer to a few.

One's actions must be governed by the conditions found.

The ideal method is resection, with end-to-end anastomosis.

With plenty of time, a lateral anastomosis, as done by Abbe, is probably the best.

If time is precious, the Murphy button will find a place, and for end-to-end anastomosis I think we have no better method.

While there is evidence to show that contraction of the line of union does follow later, still it is so much more rapid than any other method, and also more safe, that at present I think it of great value.

Many other methods have been devised, such as that of Landerer, in which he uses the potato, by making a grove at its equator into which he draws the divided ends of the intestine by purse-string sutures. The line of coaptation is reinforced by continuous or interrupted Lembert sutures. The potato has a central canal, as in the Murphy button.

The potato plate for lateral anastomosis has been devised by Dawburn, of New York. The fluid intestinal contents harden the plates for a few hours, then in from eighteen to thirty-six hours they begin to soften and are soon digested.

Abbe's cat-gut rings, Robertson's rubber rings, Senn's bone plates, and other methods are not employed extensively at present.

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I have to report four cases of acute intestinal obstruction, which have come under my observation during the last two years.

The first case shows that we cannot allow these cases to wait and drag along by resorting to palliative measures, such as the administration of morphine, lavage of the stomach, etc., thereby leading them to believe that they are doing well, until it becomes too late for radical and rational surgical interference.

Case 1—Jno. M., age 55; previous health good, but suffered some from constipation. At 2:30 a. m., October 16, 1895, was awakened by sharp griping pains in abdomen, and especially about the umbilicus. The pains were continuous, with exacerbations; bowels absolutely constipated, though he suffered from tenesmus; early began vomiting stomach and intestinal contents. Patient was brought twelve miles in a cart before I saw him. Examination showed two external inguinal herniæ, a hard abdomen, knees drawn up, facial expression of pain. Diagnosis acute intestinal obstruction, and advised immediate operation, to which he consented, and preparations were made so that he could have been operated inside of an hour after I saw him. At 9 a. m. the patient not arriving, I found that another physician had been called in and diagnosed typhlitis, and advised the patient to have no operation.

I went to his room and found him, as he said, much better, and that he would not go to the hospital. In fact, he and his friend thought they had a good joke on me for wanting to operate. However, several hours after, the patient's friend seeing that he was rapidly losing ground, asked me if I would again take the case, which I did under protest. It was now impossible to operate until 4:30 p. m., or at least eight hours after the work could have been done. Patient now was much worse and in collapse. Right hernia cut down on, but no strangulation being found, the left internal ring was explored through the primary incision, and this also found free. A medium incision was now made below the umbilicus, and large enough to admit the examining hand. Almost at once a large, dark, distended sac presented itself in the wound. The sac was very tense, and resembled a greatly distended bladder, and

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was considerably larger than a fœtal head at term. The abdomen contained a stinking sero-purulent fluid in considerable quantity, which was washed out with sterile water. No adhesions holding the mass, it was easily turned about twice to the left, when a sudden loud gurgling showed that the volvulus of the sigmoid had been reduced. A rectal tube brought out stinking gas and fluid. On further examination of the now relaxed gut, it was found that on the surface opposite the meso-colon, for a distance of thirteen inches, a gangrenous area had been formed, which varied in width from an eighth of an inch to two and one-half inches. Patient's condition was now bad, so the diseased portion was held outside of the abdominal cavity by pushing three catch forceps through the meso-colon and allowing them to remain there, the peritoneal cavity and bowel being protected by iodoform gauze. After the operation the patient had two copious bowel movements, and twenty-four hours later, the bowel was opened in the gangrenous area, the bowel irrigated, and a large rubber drainage tube passed into the upper end to keep the opening patent. Patient lived sixty hours, but died of general peritonitis. It seems quite probable that this case would have lived had he been operated when I first proposed it, as that would have been only six hours after the volvulus had formed. It is an instructive case, in that it shows what an extensive area of gangrene can form after only fourteen hours strangulation.

Case 2—A. S., Jr., age 17; previous health good. On October 18, 1895, at 9 a. m., was attacked with acute appendicitis; made a journey of 200 miles after this, and was operated about forty-eight hours after initial symptoms. An incision parallel with Poupart's ligament was made, and near McBurney point pus was encountered and the cavity drained with iodoform gauze. Four days after, a second incision was made in the right loin, but no pus found. Septic temperature and pulse, and dullness, called for another incision in front of the last one, and we opened quite a large abscess. Sixteen days after the primary operation, patient was doing nicely, and had a very free bowel movement at 8 p. m. Immediately thereafter symptoms of acute intestinal obstruction followed, such as vomiting, great pain in abdomen, absolute constipation; tem-

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perature 99, pulse 90. A five-inch incision was made parallel to right border of rectus, the upper end at the level of the umbilicus. Deep in the abdomen and attached to the wall of the abscess, was a knuckle of gut, and beneath this a loop of intestine had become strangulated by the sudden change in position of the abscess wall after the bowel movement. The adhesions were broken down, and a large strip of iodoform gauze left as drainage. The case made a good recovery, after the drainage of another abscess. The case is interesting from the fact that he recovered after four operations for pus and one for acute intestinal obstruction.

Case 3—J. B., age 52; ranchman; admitted to the Denver & Rio Grande Railroad Hospital March 9, 1896, one week after the onset of a rather subacute appendicitis. A mass could be palpated in appendicular region. Incision, under ether, two and one-half inches long at border of rectus. In breaking down adhesions between intestines and omentum the general cavity was opened several times; pus was found in about the center of the mass and a drainage tube inserted into the cavity. About nine days after the operation abdomen became quite tympanitic, causing pain, and bowels could not be moved. Rectal examination showed a boggy mass pressing down on the rectum, and a rectal tube could not be pushed past it. The mass was punctured, and a T drainage tube inserted. Bowels moved after this, and patient made a good recovery.

Case 4—R. T., colored, age 25. While lifting a log something gave away in left inguinal region; soon began to vomit and had great pain, with absolute constipation. The mass in left inguinal region became harder and larger. Forty-one hours after the accident patient came to operation. Ether; incision five inches long, parallel with Poupart's ligament; dissected to neck of sack, but here considerable difficulty was found in enlarging the latter on account of the great tension in the sac, and the fear of wounding the inclosed viscera. A stinking hemorrhagic fluid came out of the sac, and the enclosed intestines were black; peritoneum had completely lost its lustre, and after applying hot wet sponges to them for fifteen minutes it was decided to resect. Intestine was drawn out to the healthy portion and here cut transversely across. It

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was then separated with scissors from the mesentery and the vessels caught and tied, as found bleeding. When healthy gut was again encountered, another transverse cut was made, an end-to-end anastomosis with the one-inch Murphy button was made, the loop of mesentery drawn together, and a mass of omentum about the size of patient's hand resected and ligated with three locked ligatures. The testicle being atrophic, it was resected to allow of a stronger wound; the wound suppurated. Patient had pains in abdomen until the passage of the button per rectum, 186 hours after. Patient wrote six months after the operation, and said he was doing heavy work and was in good health. Measurement of resected intestine showed it to be twenty-six inches long.

DISCUSSION.

Dr. Frank Finney—I had a case of intestinal obstruction which illustrates very forcibly some of the points made by the papers that have been read. The case was that of a young man about twenty years old, residing in Las Animas, in this state, who was a patient of Dr. Dulin at that time. He was taken suddenly ill with pain, vomiting, and constipation. The doctor was called, and after seeing him the second time, made a diagnosis of intestinal obstruction, and after giving him some treatment for perhaps, I think, a day or two, he made a diagnosis of obstruction from fecal impaction in the colon. He tried to relieve him by irrigation, and I think he also gave some cathartics. The patient became a great deal worse, and the doctor called in consultation. I returned home the second day after being sent for, and went down to Las Animas.

The patient was still growing worse, and had not been operated; nothing had been done in the way of operation to relieve him, and he was in a distressing condition. When I saw him he was in almost a collapse, with a very weak pulse, cyanotic condition, and the doctors who had been called in consultation were all there at that time. Although the case seemed desperate, and I had very little idea of the patient recovering or standing the operation, I advised an incision in the right side, and at the same time, after examining the man's abdomen, I refused to concur in the diagnosis of fecal impaction.

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I took safe grounds, in the fact that I told them that I thought an incision should be made and the diagnosis as to the exact condition made after the incision, but I did not believe it was fecal impaction. I will state that there was an area of dullness which misled—giving the appearance of fecal impaction in that locality. There was a loop of the ilium about eight inches, I should say, in extent, that had slipped under an old adhesion which had resulted from appendicitis some ten or twelve years before; this loop of intestine had slipped under this band and become strangulated, and gave the dull area which they found in that locality. After opening the abdomen the band was cut and released the constriction, and relieved the bowel. This portion of the bowel was drawn out and examined, and it was quite dark, but appeared to revive after the construction was relieved. The patient was sinking from shock, so that he was taken from the table very hurriedly. It was proposed to use the Murphy button, and we had them in the solution ready with the other instruments; the majority of the doctors present rather voted against it, and it was not used. The patient died about six hours after being taken from the table, never recovering fully from the shock. It simply illustrates the point which has been insisted upon, that delay in these cases is extremely dangerous.

Dr. J. C. McClintock, Topeka, Kansas—This subject is one I am always interested in, and I have listened with much pleasure to its intelligent discussion—the most intelligent I have ever heard. I hardly know what particular paper to compliment most; they were all of high order. There are only a few things to which I beg to take exception. I would ask you to consider the question of fecal impaction, which has been spoken of several times this afternoon. Fecal impaction never did occur; therefore, let that be well considered before you say a case is fecal impaction. Such a case has never been shown on the operating table, or in the dead-house. You get the idea from text books. They use the term, and continue to use it. In the management of these cases, some one spoke here to-day of reduction of an intestinal obstruction by inflation with gases. I was very glad to hear this discussed, but do not myself approve of that plan, which is very generally condemned. The

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bowels are already inflated above the obstruction; you gain nothing by inflating below. Occasionally a case has been benefited by an enema of water. For the relief of tympanites, some one said to apply heat; heat rarifies gases, and so distends the intestines still wider. What do you gain by that? Puncture of the intestine was also spoken of, and was condemned at the same time; justly so. It is more dangerous to puncture with the aspirating needle than to open the abdomen and puncture the intestine after you bring it out. Do it intelligently, if you are going to puncture the intestine, and then it is not a bad method to employ. I have seen a great many cases of intestinal obstruction, and usually have seen them late, after they had existed several days, and the patient was almost ready to die; then to seek that obstruction means certain death. Do not try to do a complete operation on a dying patient. A life-saving operation is all you should do at this time. You can give your patient relief by opening the distended intestine and letting out the gases and feces that are above the obstruction; then complete the work at another sitting. If you have time to go through the abdomen, search the pelvis for the obstruction. If it is a twist, or if it is an intussusception, it will be heavy, and will work down into the pelvis, and that is a favorite site for the tumor—it is the first place to which we go; then to the cœcum and appendix. Remember, the distended intestine is the part above the obstruction; bring that up; don't bring it out of the abdomen; bring it inside of the wound, and the part that leads to the obstruction is the part that is most deeply congested. If you are in doubt whether you are going up or down the intestine, remember that the intestine is attached to the back of the abdomen by its mesentery, in a descending oblique line; place your thumb on one side of the mesentery, the fingers on the other, and the mesentery will show whether you are going up or down. There was something said about putting on a salt solution and acid solution to see which way the vermicular action goes; that does no good; it is more apt to go up than down.

Having now reached the obstruction, remove it if possible. I have found that a volvulus is not always easily disentangled. A band is usually severed with no difficulty. The only one

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which has ever given me any trouble, was an adherent diverticulum of Meckel. An intussusception has always given me trouble, because, unfortunately, I have always found them gangrenous. In one case I removed thirty-three inches of gangrenous gut with a perfect recovery. A Murphy button was used in that case.

Dr. F. N. Cochems—I would like to say, in defense of the Murphy button, that if it is properly applied it allows of no leakage. It gives us as large a circular scar as by any other method of end-to-end anastomosis, except, perhaps, when the ends are cut obliquely. It is the most rapid of methods, and this is of the highest importance in this class of surgical work. The method of sutures is very good in some hands, but there are not many who can suture intestines rapidly and well; while the button can be used by an inexperienced hand, and the result is quite likely to be good. Cases requiring surgery of this kind do not always fall into the hands of experienced surgeons, and it is just in such instances that the Murphy button is of great value.

BICYCLE HERNIA.

GEORGE W. MIEL, M. D., DENVER, COLO.

I desire to bring to your attention a new form of inguinal hernia under the title of "bicycle hernia." This self-injury is peculiar to the male bicycler, and I use this title for connection and forewarning.

In common inguinal hernia we have the history of some considerable strain—more often incurred by lifting—attended with considerable rupture of those parts which hold in relation the walls and rings of the inguinal canal, followed by descent of the hernial sac and its contents into the scrotum. If descent is incomplete it may so remain for more or less time—possibly years—completing later, incident upon one or more considerable unguarded exertions.

Inguinal hernia incident upon straining because of habitual constipation more closely resembles "bicycle hernia," in that it may occur by steps of progression. Differentiation lies in the fact that "bicycle hernia" does occur by steps of progres-

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sion. The internal abdominal ring first gives, because of some unusual and unguarded exertion favorable to such damage; and, unrealized and unrecognized, with continued riding, strain upon strain furthers the damage until rupture is evidenced by a tumor emerging from the external abdominal ring. Recognition may not be earlier, because the sensation of tenderness and discomfort, associated with the cord and extending to the back on the same side, is apt to be regarded as arising from below, and is attributed to interference with, and concussion against, the saddle.

Though the bicycle is the factor in "bicycle hernia," I direct attention to it in no unfriendly way, but rather to point out a serious condition of injury which may follow upon its use (I am glad to add infrequently) that foresight and care may obviate.

In considering the causes, picture to yourself the usual bicycler astride his wheel; with thigh more or less flexed, his body bends forward, the abdominal contents resting and pressing upon and against the inguinal abdominal wall. It is manifest he needs only abduction of the thigh to favor, and then sufficient strain to induce, an inguinal hernia.

About a city, or on a road, the wheel may slip sidewise in sand, gravel, mud, or on wet pavement, especially in turning; or, in crowding a car track, or the side of a wide wagon track through hardening mud, to escape a fall the rider may have occasion to make what might be termed a grand effort, with straining pressure on one pedal to maintain his equilibrium; in which, he balances to the opposite side, but turns his wheel sharply in the direction toward which he is falling, at the time throwing the knee wide to clear the handle bar; the pedal exertion falling on the same side. If the pedal be high at the instant he must strongly abduct and flex this thigh. These acts are instinctive and not wholly under his control or of his choosing; they are, therefore, not easily followed.

The novice almost invariably rides excessively. He soon joins in "runs" which take him long distances, regardless of hillocks, and with no thought of dismounting for hills. Relaxed by fatigue this hill climbing may be a harmful exertion. Riding against strong winds may carry similar risk.

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In such circumstances bicycle hernia has it origin; supplemented by similar accidents, or the strain of hard riding, it may have its development and progression.

As to treatment: To one suffering a moderate inguinal hernia the radical procedures of cure do not commend themselves.

If remedy has been sought through truss—in some hands supplemented by subcutaneous injections—the common purpose appears to be the excitation of gradual continued inflammation, sufficient to close the inguinal canal by concentric occlusion, and for better resistance the attainment of a sub-callus, if possible. In certain favorable instances this can be attained within a year; and necessitates further applications of the truss from time to time.

Together with other members of this community—five in all within the past nine months, as far as I can ascertain—it has been my misfortune to experience this injury.

In considering means of remedy it occurred to me that with precaution I might reasonably look for and expect, as a result of proper continued irritating pressure, union between the internal peritoneal surfaces of the flat sac; and as well, attachment between the sac externally and the parts in intimate contact; which result I am glad to say I attained.

The first means to this end was a proper truss, which, because of perfectly maintained pressure, with properly shaped hard rubber pad over the internal ring and inguinal canal, I found in the Smith truss, manufactured at Topeka, Kansas. The pad is large enough to close the canal, and keep the internal surfaces in contact throughout a moderate hernial sac; preventing entrance of serum, omentum, or bowel whose entrance or interposition would defeat one's purpose. The Smith truss is so arranged that while allowing easy motion to any natural posture the pad remains just where it is placed. A good pressure—approaching punishment—is necessary to secure the result desired; yet this is not so much a matter of pushing in upon the parts, as it is a matter of securing alternating pressure by bringing the parts more firmly against the pad of the truss, pressure distinctly increasing each time the limb is carried forward if the truss is not too much curved at this site.

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Having fixed relation with the pelvis, it should stand away somewhat as it rounds the ileum in approaching the injury. By this scheme deep pressure may be attained and a considerable local inflammation induced; chance for sloughing is almost nil—at most superficial—while bulging inwards is obviated.

For better comfort, and as a precaution against superficial slough, from the first the pad should have two integumentary resting places. This is easily arranged by sliding the integument upwards or downwards, which, nevertheless, permits the pad in its fixed relation with the pelvis to rest just over the hernial sac and include the internal ring. Should the skin become too sensitive to the direct pressure of the pad, a few layers of lint or an old silk handkerchief interposed will permit the same continued pressure; these measures afford, as well, more or less comforting ventilation to the part pressed upon. Indeed, the pad had better rest upon two layers of lint from the beginning, which should be sufficient in dimension to give the sides a covering when one bends against them, as in fastening or removing the shoes.

Should abrasion or slight ulceration occur, zinc ointment should be applied on lint under the handkerchief and pad; but if inflammation and pain be too much, quiet may be necessitated or the more comfortable night truss used temporarily.

The Smith truss—applied originally while recumbent—cannot be worn in bed; it is at that time removed, while recumbent, and supplanted for the night by the elastic strap New York water pad truss, which is efficient and not easily displaced if applied at good tension; as with the other truss, two or more layers of lint intervening between the pad and the integument. While not exerting the same pressure, it maintains the effect produced by the other truss, and allows rest or respite in treatment. In this manner, with these alternations, cure progresses.

The part covered will need cleansing night and morning when the truss is changed; at such moment the fingers may be slipped under the pad before the truss is completely removed and continue the same pressure without harmful accident. I reiterate—it is of the greatest importance for the success of the procedure that the hernial sac, once freed of its contents and flattened, must so remain.

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As to the period of treatment: At the end of two months the night truss may be discontinued. By that time the sac should be obliterated as such, and attached with moderate firmness to the contiguous parts. It remains for this union to season and toughen, which necessitates continuance of the Smith truss at easy pressure for thirty or forty days further, during which period the patient may bathe, begin dressing, or complete undressing, erect, yet free from truss incumbrance. When the truss is discontinued it may be advisable to maintain the tone of these parts by massage, necessitating a few moments daily. It may be well to add that for a time constipation should be guarded against.

Ninety days from the institution of such a procedure of treatment I discarded the truss; three months later I appeared equal to any common lifting, which I sought rather than avoided, that I might prove the result. This seemingly at no greater inconvenience than temporary localized discomfort from sensation of distinct tension or pulling upon the attached peritoneum, and no greater consequence than yielding of the innermost peritoneal union sufficient to ease this tension. At the expiration of six months from the time I discarded the truss I am satisfied that in continuing hard exertion I have required too much of my repair, yet I have no reason to feel dissatisfied with the result of treatment, bicycle hernia having connection with a class whose livelihood is not dependent upon great physical exertion.

In conclusion: This method, in which reparative inflammation is sought through irritation, has the advantage of being within the control of the patient, over whom the physician has direction; while the mixed method, dependent upon the combined use of the truss and irritating sub-cutaneous injections, is not altogether under control, and therefore dangerous.

Finally, I need hardly remind you that radically operated cases—though offering the surest and best results—carry with them the chance of death, and necessitate two or more weeks confinement to bed, and truss support for a time afterward.

DISCUSSION.

Dr. Leonard Freeman—The subject of "bicycle diseases" is an interesting one in this age, where every one rides a wheel;

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but I do not think it fair to saddle the bicycle with a particular kind of hernia, even in name alone. The fact is, that people do not have hernia unless they are predisposed to it in some way or other—with all due respect to the anatomy of Dr. Miel. In some the anterior abdominal pouches are unusually deep; in others the mesentery abnormally relaxed, etc. The majority of men have no such predisposition. I do not care what they do, they cannot develop a hernia. When the tendency is present, it may be developed by riding a bicycle, or by constipation, or by horseback riding, or any other form of strain; but that is no reason why we should speak of "bicycle hernia," or "horseback hernia," or the "hernia of constipation." We should not, as individuals, be afraid of developing a hernia because we ride a bicycle.

The reader makes a misstatement, perhaps, when he speaks of a "rupture" of the parts giving rise to hernia. According to my understanding, hernia does not come from a rupture of the muscles or of the peritoneum, or of any other portion of the inguinal region, but it comes from stretching and pushing aside of the tissues. I do not think, either, that a hernia is prevented from returning because the hernial sac is glued together; but it is because the other structures—the muscles, fascia, etc., —are glued together or readjusted in their relation to each other. A union of the walls of the sac alone exhibits a flimsy obstacle to the recurrence of a rupture, as can be easily seen by inspecting a recent hernial sac.

Dr. Miel certainly deserves much credit for his excellent and ingenious ideas relative to the treatment of hernia; but he seems to unnecessarily malign operative treatment. He seems to imply in his paper that operative treatment is something which is done in many cases offhand and at first sight. This is not true, however. Operative treatment is reserved in all cases as a last resort, when a truss does not accomplish the purpose, or where there is some distinct contra-indication to its use. I saw a man the other day who had a hernia which came from constipation (a bicycle rider, by the way). He attempted to wear a truss, but found it impossible to do so, because of the pain and inconvenience which it caused. That was a case for operation. If he had been able to wear a truss, and had found

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after wearing it for a sufficient length of time that it bid fair to cure the hernia, there would have been no sense in operating. Hence it is unfair to speak of the mortality from operation, as compared with the mortality from wearing trusses.

We must thank the reader for calling our attention to hernia developed by riding a bicycle; and perhaps it would be well to caution those who belong to families in which hernia is prevalent, or in whom we have reason to suppose that hernia might easily be produced; but we should not lay undue stress upon "bicycle hernia" as such.

Dr. S. D. Van Meter—I think that bicyclists ought to be thankful to Dr. Miel for calling attention to this matter, as it is an accident which is very liable to happen as the doctor has described. But I take issue with him in naming another bicycle disease. There is no question that hernia will happen just as has been described. I think we had better call attention to the fact that hernia is easily developed in that position, especially when a rider attempts to make a quick turn. On the other hand, as to the treatment, I think the doctor flatters himself in having a permanent cure. I do not think sufficient time has elapsed to entitle him to claim the cure as permanent, because I have seen several cases of hernia which were apparently permanently cured from occlusion of the sac from pressure inflammation that have recurred. I would advise instead of doing away with the truss altogether to leave it off at night; but it is far better, as a precaution and permanent cure, that it be worn constantly for a couple of years.

Dr. Miel—I am not surprised, Mr. President, that this should bring out a discussion of this character. If it had not, I should have been disappointed, because I think the matter is worthy of discussion. So far as the remarks of Dr. Van Meter are concerned, there is no doubt that the prolonged use of a truss would give still better results. I present these facts to show what can be done in a certain time. I said afterwards that I discarded the truss earlier than I proposed for other individuals. People like to discard trusses when they can; and I have so much faith in this cementing adhesion, that I am satisfied that if the hernia were again to manifest itself the truss could be effectually resorted to.

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So far as Dr. Freeman's remarks are concerned; he speaks of "bicycle hernia" having no place in medical nomenclature. I do not insist upon it; but he says, also, that those people in whom rupture might be expected (where there is family disposition to it), should be forewarned. I take exception to this. To severally forewarn persons against rupture is impracticable; as a better factor, I use this title purposely for forewarning. If it is well to forewarn, it must be accomplished in a practical way. It may be that some families have relaxed muscles and relaxed ligaments, and it is true that these favor hernia; but it is not necessarily dependent upon family predisposition. A man's condition at the time may be one of relaxation, and that certainly develops hernia if the conditions are proper. When we undertake to reduce an inguinal hernia we relax by posture. This posture is very commonly experienced in bicycling. When a student in the Jefferson Medical College, the matter of whether ligaments would stretch, or whether they would not stretch, was argued by the surgeon and anatomist. If ligaments stretch, they stretch a good deal as the cord of a parcel; they may give a little, but there is no elasticity, and they must tear to give much, as we see in the injuries to the ankle. We often have hernia produced within an hour, or half-hour, or even a few minutes, by a fall or some great exertion. It is not because of gradual stretching of ligamentous tissue, but because something ruptures.

AN INSTRUCTIVE ACCIDENT.

S. D. VAN METER, M. D., DENVER, COLO.

Feeling that if more of the accidents which happen in the practice of surgery were reported it would be more helpful and instructive than the multitudinous literature that we have on the successful operative cases, I have concluded to report the following, which happened in my hands last year:

Patient was a young man suffering with hemorrhoids, a dyspeptic, hypochondriacal, and of a very nervous temperament.

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I was asked by Dr. C. A. Powers to assist him in performing an operation for the relief of this patient's hemorrhoids, with the understanding that I was to take charge after the operation, as Dr. Powers was compelled to leave the city on important business.

Our patient was prepared for the operation in the ordinary way, and the ligature method was used in the removal of the pile tumors; but, owing to the excessive redundancy of skin, the thermo-cautery was used at four or five points radiating from the anus.

Patient reacted from the operation and slept well during the night, but retention of urine followed. Having a new male nurse on duty, it fell to my lot to catheterize the patient, and instruct the nurse in the use of the catheter. Proceeding to demonstrate to him the method of the use of this instrument, I selected an ordinary No. 12 soft rubber catheter, and grasping the penis with the index finger and thumb of the left hand, I passed the catheter, well lubricated, into the patient's bladder. I noticed at the time that the urethra was quite long, but the catheter was of more than ordinary length. The patient experienced no pain from the passage of the instrument, and the urine began to flow when the end of the catheter was within half an inch of his meatus. A few seconds after the urine started, I noticed that his penis was beginning to enlarge as if he was having an erection; at the same time the catheter was passing deeper into his uretha. As I was holding the urinal in my right hand, I started to catch the end of the catheter with my left, and in so doing, relaxed my hold on the penis, and before I could catch the catheter, it glided rapidly into the urethra and disappeared. It is my opinion that it passed into the bladder at once.

You can imagine my chagrin at such a turn of affairs, especially when I admit that I have always felt somewhat conceited in my ability in using urethral instruments. Hoping that the catheter had not passed further than the pendulous portion of the urethra, I grasped the penis as far back as possible, thinking perhaps I might recover the instrument with a long pair of forceps; but I could not discover the end of the

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catheter with a probe and the long forceps I had at hand, and, as I have said before, I believe that when it once started, it passed into the patient's bladder, and that its passage was very rapid, and if it did stop in the deep urethra, my efforts to retain it were futile, if they did not assist its passage into the bladder.

There is an expression, "Like a thunderbolt from a clear sky," and it is very applicable to this case, for in my life and experience I have had some great surprises, and experienced incidents tending to try one's nerve, but never was I so suddenly surprised as in this case.

Recognizing that the catheter was in the man's bladder, of course there were but two things to be done—either remove it by cystotomy, or through the urethra.

As Dr. Powers had not left the city, I telephoned for him, and Dr. Wm. P. Munn.

After distending the bladder with boracic acid solution, with the instruments we could obtain we made an effort to remove the catheter through the urethra, but it was unsuccessful. I have felt that if we had had the proper instruments, we might have succeeded in removing it by this method, and had we persevered, could perhaps have done so with those at hand, which consisted of two sizes of lithotrites and three pairs of urethral forceps. However, it was the opinion of Dr. Powers that it was best not to prolong the attempt to remove the catheter by this method, and that a supra-pubic cystotomy was the better method; consequently we proceeded to perform the operation, Dr. Powers as operator and myself as his assistant. Nothing out of the ordinary was encountered, it being performed by perpendicular incision, with bladder distended, and without the use of a guide. The catheter was easily located and removed, and the incision closed by double rows of sutures, with a small piece of gauze left in the lower angle of external wound, and the whole dressed with antiseptic gauze and sterilized cotton. The same catheter that was lost in the bladder was disinfected and passed into the bladder again and left there, to allow the urine to pass away as secreted, but to prevent it from going out of sight a second time, it was secured with a safety pin.

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There was at no time after this operation any oozing of urine from the cystotomy wound, and the drainage was removed on the fourth day, at which time the lower angle of the wound was approximated by tying a provisional suture introduced at the time of the operation. The catheter was removed on the fourth and seventh days, cleansed, disinfected, and replaced as before, and permanently removed on the twelfth day. The patient's temperature was never above 101, and on the whole he could not have made a better and more rapid recovery.

It is my opinion that in this case the cause of the accident was a reversed muscular spasm, assisted by a partial sexual orgasm in an extremely nervous man.

It being an unheard of accident to me, I of course began to search for it in surgical history. In none of the text books that I have read, excepting Agnew, have I found any mention of a possibility of this accident, and among my professional brethren consulted, only one has told me of a similar case.

Of course the chances of such an accident are small, but that it can happen to any one who uses a catheter, as ordinarily done, cannot be denied, and as a preventive of such an accident, I think that all soft rubber catheters should be made with a flange shoulder on the end, which would necessarily prevent its loss in the urethra.

DISCUSSION.

Dr. Leonard Freeman—I once saw a similar case to the one Dr. Van Meter has just been describing. A man, for some reason or other, inserted a piece of rubber tubing, some fifteen or eighteen inches in length, into the urethra, from which it was suddenly swallowed into the bladder. The tubing was taken out without difficulty through the urethra by means of an instrument specially constructed for the removal of foreign substances from the bladder. The mechanism is such that a long body, such as a piece of catheter, is moved around at once with the long axis parallel to the long axis of the instrument. If the surgeon is in possession of any sort of an instrument for the purpose, he should be able to remove a soft catheter from the bladder through the urethra without a cutting operation. If such an instrument is not at his disposal, there is no doubt

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but what the median perineal incision is more simple than the supra-pubic operation, just as effective, and considerably less dangerous in several respects.

Dr. W. P. Munn—I am glad to hear what Dr. Freeman has to say about this case. From the wording of Dr. Van Meter's paper, where he states that I was one of the physicians who made the search for the catheter in the bladder, my connection with this case might be misunderstood. I had the honor of being present, but I did not make any operative investigation, nor did I feel satisfied that the momentary investigation with the lithotrite was either complete in itself or satisfactory enough to justify the operative method of procedure. I feel perfectly sure that had the investigation with the lithotrite been carried on for a little longer time, the catheter would probably have been engaged and removed through the urethra without any operative procedure. I have been fortunate enough to seize a catheter in the bladder under like circumstances with the lithotrite, and could draw it partially out of the bladder, only failing to entirely abstract it because the catheter was old, not pliable, and easily broken, and after it had been seized two or three times it broke into two or three pieces. In this case it was necessary to resort to the perineal section, as Dr. Freeman has recommended. I would not like the inference to be drawn from Dr. Van Meter's paper, that either he or I made an operative attempt to remove the catheter, or that we endorsed the operation following the failure to seize it.

Dr. Robinson—A similar accident to this happened in Aspen about three years ago. A miner who lived four or five miles out from the town had been having some trouble in passing his urine, and had resorted to the catheter himself to relieve it. He sent into town and obtained a soft catheter—I think No. 10 or 12—and in attempting to draw his urine he lost the catheter. He came to town and called in the assistance of a physician, who made some effort to remove it, but did not succeed, and then sent to Denver for an instrument. Several instruments were sent up, none of which were proper for the operation. Finally, with the assistance of a local jeweler, an ordinary silver catheter was used, and a spring with a catch was

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put through with a wire attached to it, which could be pushed through and opened, and then in drawing it back it would close. With the aid of the finger in the rectum we were able to introduce this instrument and tell when the catheter was engaged. At the first effort the catheter was grasped, but in trying to withdraw it the instrument was not strong enough to hold, and it slipped. We had another one made stronger, and something like a hook, and with that we removed the catheter very easily.

RAPIDITY IN THE OPERATION OF CASTRATION.

W. P. MUNN, M. D., DENVER, COLO.

I have been much impressed and considerably surprised by the 7% mortality of cases castrated on account of enlarged prostate, as reported in White's table. That a very large share of the fatalities are due to mental shock, to the simple fact of taking an anæsthetic, to cerebral hemorrhage (as practically all these cases are the subjects of arterial sclerosis) or to uræmia, is doubtless true. But it is probable that not only are the causes mentioned made more operative, but that others are occasionally brought into play, by *unnecessary prolongation of the operation.*

My own observation has convinced me that as a rule the operation of castration is unneccessarily prolonged by defective technique of the method almost universally practiced. This is not only most undesirable in the old, debilitated patients with degenerated arteries, who submit to operation as a last resort for the relief of prostatic enlargement, but is almost equally to be avoided in those suffering from constitutional depression as a result of tuberculous, septic, or malignant disease of the testicles. In the few cases operated for prostatic disease, slow operation is the less excusable, as there are seldom any pathological conditions of the testicles themselves or of the scrotum to act as complications.

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The classical operation as described in the text books and almost universally practiced, calls for an anterior incision from the location of the external abdominal ring downward to the base of the scrotum. This places the incision at the uppermost portion of the wound and makes the subsequent progress of the operation, simple though it is, more complicated by necessitating dissection through lax and constantly retracting tissues.

The method which I have followed for several years is as follows: The parts are shaved, scrubbed, and dressed antiseptically the night before operation. The morning of operation, after the patient is anæsthetized, the scrubbing with soap and antiseptics is repeated. An assistant then grasps the scrotum with his whole hand, drawing it forcibly forward and upward over the pubes, thus causing the testicles to protrude on each side of the median line. The incision is made about an inch to one side of the median line and the testicle pops out quickly, the separation of the layers of fascia is then made quickly and easily with the fingers or the scalpel handle, and the cord is ligated and cut. If there are any sinuses they are dissected out freely and removed at the same time as the testicle. Hemorrhage by this method is usually slight and may be completely controlled by careful torsion of the bleeding vessels. When this is accomplished the incision may be permitted to contract and is readily closed by two sutures. If both organs are to be removed, the operation proceeds in exactly the same manner on the other side.

Dressing is by means of aristol, rubbed well into the lines of incision, and a bag of sterilized gauze, supported by a T or a triangular bandage.

By this method, in uncomplicated cases, the operation need not consume over two or three minutes, and there is a great saving of time, even when sinuses and suppuration complicate. The time of anæsthesia is reduced to a minimum, and the dangers of operation in those whose arteries and kidneys are diseased, especially, are much lessened.

The incision on the posterior aspect of the scrotum presents better facilities for drainage if suppurative conditions ante-dating the operation demand drainage, while the position of the subsequent scar, at a point not so readily observed by the

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patient, constitutes a further advantage, from a psychical standpoint, in old men whose mental condition may cause them to attach undue importance to trivial cosmetic conditions.

DISCUSSION.

Dr. H. G. Wetherill—I think Dr. Munn has developed a very important point in the operation of castration. It is, however, hardly necessary to do anything to shorten the time necessary for castration. The rapidity with which it is ordinarily done, and the frequency, are rather deplorable, and perhaps it would be best to do something to retard rather than to promote it. Four years ago, when in Colorado, I read before the El Paso County Medical Society, at the house of Dr. Keating, an article on this very subject. The article was subsequently published in the University Medical Magazine of that year (1892), and the suggestion then made was, that the incision be a median one, and there be but one incision through the skin. The idea of the operation came to me in this way: I had a patient in whom operation was necessary for multiple sinuses from prostatic obstruction, and in making a urethrotomy without a guide I had the man in a lithotomy position. It was a simple matter to extend that median incision up through the raphe of the scrotum; by simply incising the septum of the scrotum on either side it was very easy to get at either testicle. As Dr. Munn has suggested, the very great advantage of this procedure is that you have the patient in the most favorable position for the purpose; the incision is at the lowest and most dependent point for drainage. The advantages of the operation as suggested at that time over the operation Dr. Munn now suggests seem to me very evident, in that you have but one skin incision.

Dr. W. P. Munn—I think Dr. Wetherill's statement shows how very ephemeral some of our improvements are. Five minutes after I have reported mine, he reports another which is a great deal better.

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THE TREATMENT OF CHRONIC INFLAMMATION OF THE BLADDER, WITH REPORTS OF TWO CASES OF CONGENITAL DIVERTICULA.

LEONARD FREEMAN, M. D., DENVER, COLO.

The time at my disposal will permit me to consider but a portion of this extensive subject.

Chronic inflammation of the bladder is practically always due to micro-organisms, the one most often encountered being the bacillus coli commune, which exists normally in such abundance in the intestinal canal. The gonococcus, the tubercle-bacillus, the typhoid-bacillus, the various pyogenic bacteria, etc., are also more or less frequently found. It should never be forgotten that it is not a calculus, an enlarged prostate, a tumor, or a quantity of residual urine which is the direct cause of an inflammation, but the bacteria which have in some manner gained entrance to the bladder in presence of these conditions. Even a cancer does not produce inflammatory symptoms until infection has taken place. I had recently under my care an old gentleman with vesical carcinoma, whose urine remained free from pus for a considerable time after the growth began. It is of course possible for germs to enter the bladder through the kidneys, through the untouched urethra, and even through the blood, but in most cases catheterization is responsible for simple infection. A vesical calculus may exist for years without a sign of cystitis, provided no instrument has been introduced into the bladder. I have seen a man with an enlarged prostate whose bladder had been dilated almost to the umbilicus with residual urine for over two years, and yet the urine when removed was as clear as spring-water.

From a therapeutical standpoint, chronic inflammation may conveniently be grouped under three headings:

1. Inflammation in connection with the presence of a foreign substance—calculus, tumor, piece of catheter, etc.

2. Inflammation in connection with the presence of residual urine.

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3. Inflammation due to specific infection, such as gonorrhoea, tuberculosis, syphilis. In this category may be placed inflammation due to certain micro-organisms.

The first two groups are closely allied. It is not so much because a foreign substance exists, or because it injures the mucous membrane that inflammation occurs, but it is because the bladder is unable to clear itself sufficiently of objectional ingredients of the urine, which remain collected about the substance. In other words, it is to the residual urine, so to speak, that the trouble is due. Nevertheless, the divisions as given above are retained for the sake of convenience.

1. Inflammation in connection with foreign substances—This can be disposed of in a few words. It is self-evident that rational treatment indicates removal of the offending substance, be it stone, tumor, or what not. Simple removal is usually sufficient, provided no obstacle to complete emptying of the bladder remain, such as atony, a diverticulum, etc. I have observed a case in which a stone had existed in the bladder for nearly fifteen years, where the marked inflammatory symptoms disappeared within a few days after lithotomy had been performed.

2. Inflammation in connection with residual urine—This is met with in enlarged prostate, stricture of the urethra, paralysis and paresis of the bladder, certain diverticula, etc. In case of stricture, the enlargement of the narrowed urethra is the essential feature of treatment. The management of other forms is not so simple, and often taxes the surgeon's resources to the utmost.

General treatment—It should be appreciated by all, as it is by those well versed in affections of the bladder, that general treatment is of much less use than is usually supposed. The various balsams, resins and other compounds, so often mentioned in books and so widely advertised by many firms, often do some good, it is true, but as curative agents they are sadly deficient. They are, nevertheless, prescribed on every hand, frequently to the exclusion of local measures. Local treatment in chronic cystitis is the only reliable treatment.

We do not speak at present of "soothing the mucous membrane" by internal remedies, but of "inhibiting bacterial

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growth by means of antiseptics." Good may be accomplished in this way although much less than is often imagined. Perhaps the most satisfactory drug for the purpose is salol, given every few hours in five-grain doses.

The patient's bowels should be kept open, not only because constipation leads to congestion of the vesical veins, but because there is no more efficient method of removing poisonous substances from the system than through the bowels. The necessity of proper foods, tonics, cleanliness of the skin, etc., will suggest itself to every one. Plenty of milk at frequent intervals does excellent service, both as a food and as a diluent of the urine.

Local treatment—The main indications are: (a) Disposal of residual urine. (b) Washing out of bladder.

(*a*) *Residual urine*—This must be removed, no matter how small the quantity. If the urethra will easily admit of a catheter of sufficient size to thoroughly drain off not only all traces of urine, but stringy pus and clots of blood which may also be present, then the regular use of a catheter will often be sufficient. When the inflammation is obstinate or severe, a soft catheter may at times be tied in and continuous drainage instituted. This method, which, strangely enough, is not extensively used in this country, gives excellent results, even in cases of enlarged prostate. But if only a very small or specially constructed instrument can be employed, or if the patient cannot be intrusted to catheterize himself, or if the channel is irritable and remain so, or if there are other reasons why the use of a catheter is unsatisfactory, then more radical procedures become necessary. At the present day the measures most frequently adopted are (1) castration, (2) resection of the vasa deferentia, (3) supra-pubic cystotomy, with retension of a permanent opening.

A sufficient number of cases have been reported for us to say with considerable certainty that, in general, castration furnishes the surest and safest means of combatting the evil effects of an hypertrophied prostate. Some cases of inflammation, however, are so severe, and the debilitated patient so much in need of immediate relief, that supra-pubic cystotomy should be done at once, and thorough drainage of the bladder

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secured. In all other cases castration is applicable, provided the nature and consequences of the operation are fully appreciated by the patient. Among those within the age of sexual activity there will always be some who naturally object to the removal of the testicles, no matter how strongly the operation may be indicated. For these the older operation of prostatectomy is in place, although it should not have the preference, on account of its uncertainty and danger. For patients who, while recognizing that their term of sexual activity is past, still object to castration for various reasons, resection of the vasa deferentia may be done, although it offers a less certain prospect of cure than removal of the testicles themselves.

(*b*) *Washing out of the bladder*—Several points should be borne in mind in this connection.

1. The bladder must not be over-distended, as this may keep up a chronic inflammation which would otherwise tend to subside. There is also reason to suppose that septic material can in this way be forced into the mouth of the ureters, thus leading to kidney complications. Not more than four or five ounces of fluid should be employed, and less than this is often preferable. A good sized syringe of hard rubber, which can be easily worked with one hand is safer and better adapted to the purpose than a fountain syringe, although the latter is in general use.

2. The prostatic urethra should be irrigated as well as the bladder itself, especially in gonorrhoeal affections, as it is often the seat of inflammation which may reinfect the adjacent viscus. The catheter should be slowly inserted while the fluid is being injected, until the fluid no longer appears anteriorly at the meatus, but passes through the deep urethra into the bladder, the eye of the catheter being just beyond the constrictor muscle. When practicable, it is well to leave considerable fluid in the bladder, which the patient is instructed to pass after the catheter is removed, thus irrigating the channel from behind forwards. If the bladder, however, is insufficient, and the solution not a mild one, it is better to withdraw it entirely. In obstinate cases of posterior urethritis it answers an excellent purpose to occasionally inject a few drops of concen-

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trated solution of nitrate of silver (1-2% to 5%), with an Ultzmann's capillary injector.

3. A single, not double, catheter should always be used. The current from a double catheter selects some short, easy channel for itself, and passes directly from one eye of the instrument to the other without distending the folds of the mucosa and cleansing the bladder as it should.

4. When the organ is not too sensitive, the fluid should be injected with some force, so as to more effectively wash the mucosa.

5. The catheter should be soft rubber or linen, as large as can be used without undue discomfort, especially when thick pus and clots of blood are present; and it should not be forgotten that a catheter is just as large as its eye and no larger.

6. Almost any antiseptic or astringent fluid will give good results if properly employed. Personally, I prefer the permanganate of potassium or the nitrate of silver. The former is both an antiseptic and an astringent, and its strength can be conveniently judged by the depth of color of the solution. The stains are quickly removed with oxalic acid. The nitrate of silver is less easily handled, but sometimes gives better results.

7. One daily irrigation is usually sufficient, although two may be required. Care should be taken not to carry the treatment too far, and cause more harm than good by undue interference.

8. It is generally more satisfactory to irrigate an insufficient bladder with the patient standing, as the viscus is more easily cleansed in this position.

In this connection I desire to briefly mention two cases of congenital diverticula of the bladder. These malformations are very rare, and present many puzzling features to the diagnostician. They are similar in appearance to the diverticula which occur in inflamed bladders with hypertrophied trabeculæ and obstruction to the outflow of urine. In congenital diverticula, however, there is not necessarily any damming back of the urine with distension, and there is little or no tendency to progressive enlargement. At times, practically a double bladder exists, with a ureter emptying into each division, but

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the results are clinically the same—the retention of residual urine, and a tendency to chronic inflammation and the formation of calculi.

One case came under my charge a number of years ago, in the Cincinnati Hospital. He was a young man of good physique, who had experienced no marked urinary disturbance until he suffered an attack of gonorrhœal cystitis. This proved to be extraordinarily obstinate, and yielded to none of the usual forms of treatment. There was little or no prostatic enlargement and no urethral obstruction. It seemed almost inexplicable to me at the time, that after the man had passed his urine, a catheter would draw off an additional quantity, and after some moving about of the instrument in the bladder, still more would be obtained. The patient shortly died with surgical kidneys, and at the autopsy four or five diverticula were found, each somewhat larger than a walnut. They diverged from the posterior and inferior walls of the bladder, were perfectly smooth within, and their openings were about the size of the little finger.

The second case was a young man of 29, who has recently been under my care. He is well built and active, both physically and mentally. Up to about the age of 15 nothing abnormal was observed in connection with the urinary apparatus, except that the urine appeared to be unusually strong in odor. About fourteen or fifteen years ago it became necessary to pass a catheter, following an injury to the back with hematuria. Cystitis with pyuria quickly developed, which persisted for a long time. After much and varied treatment, it was finally cured by irrigation. The patient's health remained good for five or six years, until, as a consequence of an injury to the back, retention of urine took place and a catheter was again passed. Cystitis once more supervened in an aggravated form, and continued for nearly ten years, in spite of the most strenuous efforts towards its subjugation. During this period the gentleman was under the care of many of the world's most eminent surgeons, including Agnew and J. William White, of Philadelphia; Sir Henry Thompson, of London; Czerny, of Heidelberg, and Guyon, of Paris. The presence of a diverticulum was not suspected, even after prolonged and careful examination

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with the cystoscope. (I mention these names in order to show that the diagnosis of a congenital diverticulum of the bladder may be exceedingly difficult, not to say well nigh impossible.) When the patient came under my charge he was in a pitiable condition. He was forced to urinate with pain and strangury about every twenty minutes, both night and day, and it was necessary to frequently irrigate the bladder in order to make life even tolerable. The urine was loaded with blood and pus, and was offensive in the extreme; there was, however, little fever. The passage of a Thompson's "searcher" in the effort to find a stone, stirred up a quantity of decomposed urine, which called my attention to the possibility of the existence of a diverticulum, but the idea was partially dismissed, because of the amount of hemorrhage, which was more consistent with the presence of a tumor or of tuberculosis. A careful examination of the urine, by Dr. E. R. Axtell and myself, failed to reveal tubercle-bacilli, so that the idea of tuberculosis was given up. A supra-pubic cystotomy was made for the purpose of drainage and of exploration, especially as some form of tumor was strongly suspected. An opening large enough to admit the little finger was found in the trigonum, to the left of the median line, which communicated with a diverticulum the size of a Messina orange, passing upwards and backwards along the side of the sacrum to the left of the rectum. The interior was smooth and nearly spherical in shape. After the pouch had once been recognized, it could be felt by a finger in the rectum. It being manifestly impossible to remove the diverticulum through a supra-pubic incision, it was decided to drain the bladder until the cystitis had subsided, and then attempt to close the opening without recurrence of inflammation. If this failed, an attempt could be made to remove the pouch from below. The cystitis rapidly and completely subsided as soon as thorough drainage was instituted, the patient improving rapidly in weight and general condition. An attempt to close the artificial urethra was soon followed, however, by a reappearance of the inflammatory conditions, due, probably, to infection from the prostatic urethra. Drainage was again procured and the entire urethra and bladder subjected to frequent irrigation with permanganate of potassium

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and nitrate of silver. The next move was to drain the bladder through a catheter tied in the urethra, in order to give the fistulous opening an opportunity of closing. The prostatic portion of the urethra, however, proved to be too irritable, in spite of injections of nitrate of silver, etc., to permit the carrying out of this process. The patient was then fitted with a convenient apparatus for controlling the flow of urine from the artificial urethra, and now finds himself perfectly comfortable and free from pain or annoyance of any kind.

An examination of these two cases presents some interesting points:

1. Congenital diverticula can exist for many years without their possessors being aware of any abnormality.

2. Cystitis may not take place until infection is caused by catheterization, gonorrhœa, etc.

3. Cystitis in the presence of diverticula may sometimes be cured without opening the bladder, and remain so indefinitely, provided reinfection is not brought about.

4. Hemorrhage from chronic cystitis may be so great as to strongly simulate hemorrhage from a tumor.

5. Residual urine, without stricture of the urethra, enlargement of the prostate, or paresis of the bladder, should be suggestive of a diverticulum.

6. Even in the best hands, the opening of a diverticulum may be overlooked with the cystoscope. A reason for this is, that the mucosa during life is so congested and folded about the opening as to conceal it.

7. In obscure vesical affections, with cystitis, it is rational to open the bladder for purposes of exploration and drainage, the preferable incision being the supra-pubic, as offering the better opportunity for removal of foreign bodies if such be present.

DISCUSSION.

Dr. C. A. Powers—A most important practical bearing of deformities of the bladder is in regard to the radical cure of hernia. It has been my fortune twice to have seen a diverticulum of the bladder during the operation for hernia. The cases were very much alike. The sac of the hernia was found without difficulty, and was opened; near by it was found another

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sac, which was thought to be a diverticulum of the hernial sac. This was opened and found to be the bladder. In each instance the rent was sewed up, and the patient recovered without further symptoms. Some months ago Dr. Curtis, of New York, collected such cases encountered in operating for hernia, and if I remember rightly, found some twenty or twenty-five instances. It is something that I think we should remember, and which may occur to any one of us in doing an operation of this nature. The second of Dr. Freeman's cases emphasizes the absolute importance of the greatest care in catheterization. This is not a simple procedure—it is one which requires the greatest caution; and we should all bear in mind the importance of the most perfect asepsis in doing it. In the diagnosis of the forms of chronic cystitis, it seems to me that the cystoscope is of the greatest value. The intelligent use of the cystoscope will not infrequently clear up conditions which seem very obscure.

Dr. Leonard Freeman—The difference between an ordinary diverticulum of the bladder and a congenital diverticulum must be kept clearly in mind. The cases to which Dr. Powers refers, as having been found in various hernia operations, were probably acquired diverticula, arising in the course of cystitis, with obstruction to the flow of urine. The number of congenital diverticula encountered in hernia operations must be exceedingly small, and need cause us but little concern.

HERNIOTOMY, WITH REPORT OF CASE.

W. W. GRANT, M. D., DENVER, COLO.

The spermatic cord is the main obstacle to success in operations for the permanent cure of hernia, and its disposition has received important consideration by surgeons in the long past, as well as in more recent years. Only a few years ago, the radical operation was regarded as too serious and hazardous to be generally advised or undertaken, and hernial patients were relegated to the use of the uncomfortable truss, which is still the rule of practice. Yet, under modern surgical methods,

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the operation is not one of much danger, and is positively indicated in every case where the hernia is not easily and comfortably retained by a truss, or when the patient does not care to be annoyed by the use of a truss; also, in those cases complicated by an undescended testicle. If the latter is in an adult, the testicle is usually atrophied, and castration should be performed at the same time.

Stitching the canal is essentially a recent operation, but dissection and ligation of the sac (including castration for the purpose of eliminating the cord) are as old as Celsus and Paulus Ægíneta, and were often successful in curing the hernia.

Then followed an era of actual cautery and caustics by Lanfranc, Albucasis, and others, with the object of producing cicatricial tissue, which, by its contraction and supposed strength, would so reduce or destroy the canal as to prevent the hernial protrusion.

At a later date, Ambroise Paré describes the operation known as the royal stitch, which was much in vogue with French surgeons, and consisted in exposing the sac by incision, and then carrying a gold or lead wire to and fro through the neck of the sac and twisting it—expecting by this process, obviously, to constrict the canal and prevent descent of intestine.

In the early part of the eighteenth century, drainage after incision was in general use in Paris. Petit filled the wound with lint to promote healing by granulation, to be followed by use of truss; practically the same operation is advised by McBurney and Morris, who, after dissecting and ligating the sac, pack the wound with iodoform gauze, in the belief that the granulation and cicatricial tissue, six or eight weeks in closing the wound, will present a safe barrier to the exit of abdominal contents. This method will hardly commend itself to most good surgeons, unless in certain dirty cases of strangulated hernia, or old, fat subjects.

The early part of this century witnessed the operation by seton—Riggs' method—which was soon abandoned.

The latter half of the present century signals the entire dissection and removal of the sac, by Schumacher, followed by Langenbeck, who dissected only the canal portion, which was

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sufficient for the application of sutures. Dissecting the scrotal part added, he contended, needless irritation.

Velpeau treated by iodine injections, and, in 1836, Joseph Pancoast injected iodine and cantharides, in one or two dozen cases, benefiting all and curing some.

In 1843, the oak bark infusion treatment by subcutaneous injection, originated by Pancoast, was revived by Heaton.

The iodine treatment was revived in 1854 by Nelaton, Ricord and Maisonneuve, and flourished for a few years.

In 1861, Dr. Wood, of Cincinnati, first operated by subcutaneous suture of the external ring. Then, we have the invagination method by plug and wire suture, by Agnew.

From the confusion and various devices and theories of the long past have been evolved the recent successful methods of procedure, the salient feature being the dissection of the sac, especially of the canal, and the proper application of sutures. Since 1882, methods and results have created opinions of great and doubtless permanent value.

In 1886, Macewen, of Glasgow, published results of his method, which was so much better than any that had preceded as to attract universal attention and give this method a conspicuous place in the surgery of hernia to-day. He dissects the entire sac to within the internal ring; then the sac is puckered or folded on itself and transfixed through its center with one long thread, which, in the eye of a long needle, and guided by the finger in the canal, is thrust through the abdominal muscles at upper angle of incision and fastened. The sac is thus converted into a pad against the internal ring. The canal and skin are now closed separately with catgut sutures. Decalcified bone is used for drainage. In feeble subjects, devitalization of the sac *may* occur; but it is too remote to serve as an objection. It is a safe and secure operation.

Bull dissects the sac and ligates high up; does not suture internal ring; many cases suppurated.

Barker, of London, and Roswell Park, of Buffalo, dissect the sac of the canal only, which is ligated and cut off. The scrotal sac is not disturbed. The canal is closed by interrupted sutures.

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The trend of the latest surgical opinion is to reconstruct the canal and restore its obliquity. In the accomplishment of this purpose, Bassini, of Padua, in 1888, and about the same time Marcy, of Boston, performed practically the same operation. The canal is exposed by an incision three or four inches long and the entire sac, dissected carefully from scrotal tissues, cord and canal, is ligated at the external ring and cut off; the stump forced into the internal ring; the cord is raised and the posterior wall of the canal, which is generally thin and weak in chronic cases, is fortified by uniting transversalis fascia and muscles. The cord is replaced and the canal closed. Halsted, of Johns Hopkins, at about the same time, and with a similar object, transplanted the cord to the outer angle of the wound and strengthened the posterior wall by uniting the aponeurosis of the external oblique posterior to the cord, thus making a new external ring, and, it would seem, a more direct canal, though changing the angle. Gauze drainage is used. The Bassini-Marcy operation is in more general favor.

In all methods, care should be used not to constrict the cord with the sutures. With Marcy, the point of most significance and importance is the use of the buried tendon suture throughout the operation, including the closure of the skin by a running stitch which penetrates only the under or deeper layer of the skin, near the line of incision.

By this method (of which he is the author), he claims the great advantage of preventing stitch abscesses, which seem to occur with considerable frequency, notwithstanding the usual precautions to prevent infection. It would seem a justifiable conclusion that, with the faithful and thorough application of the rules and principles governing clean and antiseptic surgery, stitch abscesses should be rarely encountered in the ordinary method of closing skin wounds; still, there can be no objection to its thorough trial, though its claims may seem doubtful.

With this incomplete and brief retrospect, I wish to report the case of R. S., aged 40, who, about May 6, 1894, on account of defective sidewalk, fell on his abdomen, producing a left, oblique inguinal hernia.

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To relieve pain, Police Surgeon Johnson gave a hypodermic injection of morphia and atropia, but was unable by taxis to effect reduction; and patient was sent to St. Joseph's Hospital, where interne Baker succeeded in effecting a reduction of intestines, but the larger portion of the mass he could not reduce.

On May 26, the patient was placed in my care. The acute symptoms had been relieved, but he was suffering considerable discomfort from an omental hernia, and the next day, May 27, I operated by making a three-inch incision over scrotum and canal, nearly parallel with Poupart's ligament and over the internal ring. The mass of omentum, as large as the hand, was rather tightly constricted by the canal and external ring, and was adherent to scrotal tissues and testicle. After separating adhesions, the omentum (which was not adherent in the canal) was ligated at the external ring and cut off. Believing that I could obtain a satisfactory result by using the stump, as Macewen does the sac, I carried each end of the omental ligature with a long-handled needle, successively through the muscles in the outer angle of the wound, about one-quarter of an inch apart. The stump was forced by the finger into the internal ring; the ligatures tightened, tied and cut short; the object being that inflammatory adhesion would make the occlusion permanent. The canal was now closed with three interrupted silk sutures carried through Poupart's ligament on one side and muscle-conjoined tendon and aponeurosis of external oblique on the other. The skin was united with chromicised catgut; no drainage employed. Antiseptic dressings and bandage completed the operation. The wound was examined at the end of a week and found united perfectly, without a drop of pus. No truss was worn.

Nothing less than a year can be considered a satisfactory test of the success of a herniotomy. The patient is perfectly well to this day, and the cure is doubtless permanent, with no indigestion or unpleasant feeling in consequence of the omental adhesion.

This operation is eminently successful in the young. The contra-indications are only such as would apply in any severe operation. In strangulation, there are no conditions, and the

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method of procedure must be determined by the history and condition of each patient and of the parts involved. The Macewen or the Bassini-Marcy or Halsted operation will meet the indications in most cases certainly. In most recent cases, the simple dissection of the sac of the canal and buried stitches of strong, durable material, will be entirely satisfactory. Modifications in response to the judgment of different operators are usually permissible without prejudice to the patient, and often to his advantage.

In long standing cases, where the canal is practically obliterated, I should have more confidence in the success of an operation, should the internal ring be sutured; and, in my opinion, the buried stitches to the canal, in all cases, should be composed *of silk*, or kangaroo tendon or silkworm gut, unirritating and practically non-absorbable material. Clean cases do not require drainage. Should it be deemed necessary in any case, bone or antiseptic gauze will meet the requirements satisfactorily. It is quite the custom to attribute the achievements of modern surgery almost entirely to cleanliness and the use of germicides. I hope I will not be considered unorthodox, or lacking in devotion to Listerism, elaborated and perfected as it is to-day, if I suggest that there are other things necessary to the accomplishment, and continuance, of this great work. First, a high order of talent and natural fitness, as well as preparation and equipment, for the work to be done; better appliances, weapons and material; time and anæsthesia; quick perception, the adroit use of fingers and hands—these have played a conspicuous part in the surgical triumphs of the present day.

Feeling secure against septic infection, I believe it not an uncommon error in many surgeons to underestimate the evil consequences of prolonged anæsthesia. In some cases, possibly many—in explanation of the fatal result—the word ether or chloroform might with perfect propriety be substituted for shock or uræmia; therefore, time is often an element of the greatest importance and consideration in the prognosis.

DISCUSSION.

Dr. Finney—I wish to say a word in regard to the sutures used in these operations. Dr. Grant says in his remarks that

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he would prefer silkworm gut or silk. That question as to what is the best to use for buried sutures is one of the most important points in the operations for the radical cure of hernia. I asked Dr. DeGarmo that question last fall, as to what he considered the best material for them, and he said undoubtedly kangaroo tendon was the best, and gave as his reason that it was not absorbed in so short a time as catgut, but in comparatively a long time—three or four months—and was non-irritating; that his experience with silkworm gut was that it was very irritating, and was apt to cause abscess; and the same was true of silk, and that either of them, put in so near the surface as the sutures are in the Bassini operation, would very often cause abscess.

Dr. W. W. Grant—Dr. Marcy, of Boston, is especially fond of kangaroo tendon and uses it exclusively; yet most surgeons who have used the silkworm gut have not found any trouble from abscesses. It certainly will not absorb. You can tie it in a hard knot and cut it so short that the knots will not irritate the parts, at least not produce any serious inconvenience. Good aseptic silk is an excellent material, and on these three I should certainly rely. Dr. Marcy is the author of the stitching of these wounds by sub-cutaneous suture. Halsted, of the Johns Hopkins University, has used it at Marcy's suggestion, and is using that method of closing the skin wound. Most English surgeons use what is known as the chromicised catgut. This gut will not absorb in a few days, but rather in ten days to two weeks. The advantage of a suture that will not absorb for an indefinite time—at least a long time—is that it holds these parts together and resists whatever pressure there may be through crowding at the internal ring.

The operation in a case of inguinal hernia, I think, is one of the most important we have to deal with. It is to be done carefully. It is not a very serious operation, though so regarded in the past, and that is the reason or explanation of its being so seldom performed. The hernia frequently returned after the operation, not so often now as formerly, but certainly it is in very recent years that it has been made permanent; so I have made the statement that nothing less than one or two years can be considered sufficient time in which to call a case of this

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kind cured, and I believe that in the future there will be no need of people wearing trusses and being annoyed as they are in hot weather and rendered uncomfortable; and most people could avoid the use of trusses if they would be willing to undergo the operation of herniotomy.

CAREFUL CASE RECORDING AS A FACTOR IN EXACT DIAGNOSIS, AND AN AID TO RATIONAL TREATMENT.

H. G. WETHERILL, M. D., DENVER, COLO.

There can be little difference of opinion among physicians as to the necessity and convenience of a careful record of cases in most lines of medical and surgical work. The many and great ends to be so attained have often been expounded, and it is my purpose in this paper simply to again impress the necessity for the record of cases, considered from a standpoint of diagnosis and rational treatment; and make you acquainted with a system which in my hands makes the work more satisfactory and much less laborious than it has been heretofore under the "case-book" method.

That records of cases are not made as they should be among all classes of practitioners, and even in hospitals, will be generally admitted; but when one considers for a moment the vast amount of work (drudgery of a most distastful kind) that the keeping of anything like a full record of one's cases means to a busy doctor, he is disposed to excuse the neglect.

Anything which tends to make case recording less burdensome and at the same time more accurate and convenient for reference, will be accepted by the profession most gladly, and add to the detail and full record of the work we are doing.

Diagnosis, according to Gould's latest medical dictionary, is "the distinguishing, fixation, or interpretation of a disease from its symptoms."

This definition is insufficient and inadequate in that it by no means covers the ground; diagnosis from symptoms alone

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must of necessity be often erroneous, as it bases an opinion on the least reliable of the data available for the purpose, leaving out of consideration the family history, the previous history of the patient, and numerous other important points. As to the story of the patient himself (the subjective symptoms), they must often be disregarded totally.

Now, what does a carefully taken history of all the available facts which bear upon a case do? How does it help us to a correct conclusion, and how to a proper remedy?

To sum up the good it does in a few words, it is enough to say that it prevents a "snap diagnosis," and of course "snap treatment."

It is wonderfully pretty and brilliant for a doctor to diagnose a case at sight, or from a lock of the patient's hair; but the great probability of his having made a mistake which may cost a human life detracts somewhat from the effect.

Correct diagnosis is rarely easy, and often impossible, even with all the available facts at hand. It is the corner stone and chief foundation upon which treatment is based, and cannot be too carefully considered or elaborately gone into. The great success of modern surgery is as much due to a better understanding of the conditions we treat, as to the use of antiseptics. The diagnoses of appendicitis and of ectopic pregnancy alone have saved hundreds of lives since the study of the details of these diseases has made diagnosis possible.

For my own part, I regret nothing in my whole professional career as I do the cases I recall in which a hasty diagnosis led me to erroneously treat a patient, or do an improper operation. If I felt that I alone had had this experience it would drive me out of the practice of my profession.

The law requires a physician to "exercise only *ordinary* care and skill" in his work; it would be unreasonable to ask him to be extraordinary, infallible, or superhuman. So long, then, as physicians and surgeons are only human beings, they will be liable to error; but not on this account excusable from the consequences of avoidable error, or the failure to exercise "ordinary care and skill."

All the available data which may bear on a case should be before one for consideration as a whole, previous to the mak-

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ing of a final diagnosis, provided, of course, that the nature of the case will permit of the delay necessary for this work; emergency and critical cases requiring prompt action must forego this safeguard and take the chances of action on the spur of the moment.

More than once have I known the failure to have a full and complete history of a case lead to serious error, and the fault was often a failure to develop the facts which bore upon the etiology. Symptoms are usually fully elicited, but as has been said, symptoms are often misleading and not to be given too great weight in forming an opinion. Family history, personal history, age, occupation, environment, predisposition, exposure to contagion, accidents, miscarriages, work, worry, temperance, sexual irregularities, and the functional regularity of all the organs under ordinary conditions, must be noted. These and a host of other points should be considered with the symptoms, and an effort made to get at the truth and eliminate the unimportant and misleading.

In regard to treatment, it is enough to say that it is in every instance secondary to, and must be based upon, the diagnosis; if the diagnosis is at fault, the treatment will be misapplied and in all probability injurious rather than beneficial.

The good which may accrue to a patient in after years from the record of a former illness or operation is self-evident; even should the case be in the hands of the same physician, he will have forgotten or overlooked some of its features, and should some other have the management of the case, or the patient be in some other hospital, the record will be invaluable. Such records may even be of use to the second, third, or fourth generation, in that they may fix a family predisposition.

The great bar to accurate history taking is the extra work it entails.

The way to make any kind of drudgery easier is to so systematize it and simplify it as to have it take care of itself, to a degree at least.

The plan which I have adopted for taking the histories of my patients is not new in any of its essential features, having been in use in various forms, and for different kinds of work, for many years; but the system as I have adapted it to my

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special needs is convenient and satisfactory to a marked degree, and may prove of use to some one else with like needs. It combines the "card catalogue," and an outline diagram for the sketching in of those pathological conditions and malpositions of the organs with which my work has to do.

The advantages of the card catalogue over the case-book are many. It is less bulky and cumbersome on the desk, more readily referred to, and better for filing away when the case is done with; it affords ample room for all records, can be easily replaced by a new sheet if any blot or bungle has been made, and by the facility of its operation it tempts to fuller and better work.

In hospital practice and private cases out of the office, it can be kept on the temperature chart board for daily reference, and the making of additional notes, so serving to refresh the mind of the surgeon at each visit; being ever ready for new entries, afterward being filed away as with office records. The name of the patient and the name of the disease diagnosed are at the top of the sheet; the filing may be done by the name of either, depending upon the use that will be made of it, so facilitating the grouping of cases and the making up of one's statistics.

The use of an outline drawing to be filled in as the case requires, is also an old idea, which has been applied to many lines of special work, including gynecology. The sheet with the thorax outlined upon it, which was designed by Dr. Charles Denison, of this city, some years ago, is admirably adapted to chest cases, and its use would of necessity lead to greater painstaking and accuracy in diagnosis and treatment. To nose and throat work the same thing has been applied, rubber stamps have been used, and the lucky man who can make a free-hand drawing has been in the habit of making sketches of the conditions he meets, to be stowed away with the history. This free-hand work has long been a feature of the histories of Dr. Howard Kelley's cases, a place being reserved on his book for the drawing; few men, however, have his dexterity in free-hand drawing, and I cannot help believing that even if they had, the accuracy and relative position of the parts would be improved by a good outline basis for it.

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Name Diagnosis

Residence Date 189

Age S. M. W. Occupation

Referred

Patient of Dr.

of

Para Last labor

Inst. delivery Recovery

Miscarriages Recovery

Accidental or induced

Coitus Conception avoided by

Menstruation

Leucorrhea

Past health

Family history

Symptoms

Development of

General appearance

Appetite and digestion Bowels

EXAMINATIONS

Vag. outlet

Rectum and urethra

Vagina

Cervix

Uterus

Tubes and ovaries

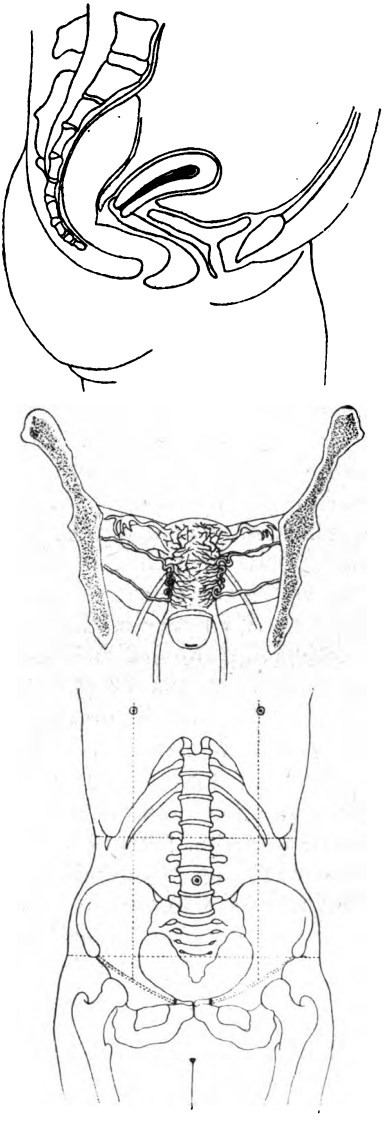
Appendix vermiformis

Kidneys Urine

Growths or tumors

Treatment

(Over)



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For my sheet three outlines were made—the first a side view of the female pelvis with the organs in the position they would relatively occupy as shown by a median section; the second a median cross-section of the pelvis, and the third showing the abdominal regions.

These sketches were beautifully made for me by Dr. A. C. Stokes, of Trenton, New Jersey, with pen and ink; and well electrotyped and printed by a pains-taking Denver firm. The result, as a whole, is a well executed piece of work—drawings, printing, and paper being highly satisfactory.

In regard to the uses of these cuts, the intention must be quite evident. The first can be used to show antero-posterior deviations from the normal position of the uterus, prolapses and lacerations of the vagina and rectum, inflammations of the bladder, uterine canal, or vagina. The second is adapted to tubal and ovarian diseases and displacements, as well as those lateral deflections of the uterus, the importance of which has been so recently pointed out by that careful observer, Dr. Edward J. Ill, of Newark, New Jersey. Cervical lacerations and erosions may also be shown here as well as the position of intra-pelvic neoplasms and masses of any kind, including their relation to the viscera.

The third may be made to picture the extent of abdominal growths and tumors, the position of displaced organs (as movable kidney), and serve to note the progress and development of growths (increase or decrease in size) from time to time.

As to the advantages of diagrams and pictures to scientific work of this kind, there can be little doubt; the modern medical book publisher understands this thoroughly, and to the introduction of this feature is due the usefulness of some of the "systems" and "cyclopedias" lately crowded into the market. They are too voluminous and numerous to be read and digested by any active practitioner, and were it not for the illustrations, few of us would ever get any idea of what they contain, excepting as they are referred to for some special matter.

One takes in at a glance the features of pictures, and for the purpose of case recording, they are invaluable, as they convey at once an idea of the whole case and refresh one's memory as to its details.

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If it is desired, red ink or pencil may be used to portray a condition of inflammation, and blue or black all other conditions—as malpositions, tumors, abscesses, plastic exudate, etc., etc.

The sheet is eleven and a half inches wide by nine inches deep, and is closely ruled on both sides. This size is chosen for the purpose of having it fit snugly into the ordinary file to be had in the stores; the size can be varied to fit any space in a file or drawer of a desk which one may wish to use for the purpose. It is quite large enough for all ordinary work, but is easily supplemented with one or two additional sheets if they be needed.

In addition to this sheet I have had one made which contains the cuts only; these may be used for many purposes, but will be particularly useful for enclosing to any physician one may wish to report a case to, so giving him a clear idea of the exact conditions as they have been diagnosed, and are believed to be; as in making a report of a referred case to the family physician. Changes in size, position, and relations, may also be noted on these extra cards, and attached to the original history sheet.

Two points in the history, as set down on this sheet, I would like to ask your particular attention to. They are details not usually noted in the history blanks I have been familiar with, and sometimes not inquired into at all, while in my experience there are no two things which have a closer relation to the diseases of the genital organs of women, or that will throw more light on their causes and effects.

I allude to the query as to the means used to prevent conception, and the question about coitus.

I need hardly go into details of the consideration of this matter, but would like to recall to your minds the grave and serious genital and nervous conditions some of the means for preventing conception are directly responsible for, and suggest that no amount of delicacy or consideration for our patients should influence us to neglect the obvious duty of finding out about this matter, and advising the often innocent victim of the risk she runs.

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The symptomatology and sensations of coitus may often be a valuable guide to correct diagnosis, beside being a very interesting and noteworthy point in connection with the large number of oophorectomies done the past few years; a correct history of the subsequent and consequent course of these cases is necessary to a proper understanding of the results of our work, and a valuable point in the consideration of what may be best for the patients of the future.

Sneer as we may about empiricism and empirical practices, the fact remains that the experiences of the past are, after all, an indispensable and invaluable guide to the progress of the future; and while we theorize from a scientific basis, we must not lose sight of the fact that it is results we are after, and that those means that have led to success in the past, will serve us well in time to come.

Knowledge of broad general principles we must have to start with, but it will be worse than useless if we lack the ability to apply it to the eccentricities and exigencies of the particular case under consideration.

To do this, all the facts of the history of the case in hand must be carefully gathered and recorded for consideration, as well as stored away for future reference.

To fill all these requirements, and to do this work with the least possible trouble and labor, this sheet has been designed.

SYMPHYSIOTOMY, WITH REPORT OF TWO CASES.

T. MITCHELL BURNS, M. D., DENVER, COLO.

Definition: By the term "symphysiotomy," or better, pubotomy, we mean the separation of the pubic symphysis for the purpose of increasing the size of the pelvic canal when it is too small for the exit of the fœtus which is to pass through it.

History: This operation was first performed in 1644, by Courveé, of Warsaw, who operated to extract a living child from a dead mother. The first operation on the living subject was done by Sigault, in 1777, and was successful, but the operation soon died—like many of the patients—from sepsis. In

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1866, Morsisani and Novi resurrected it, and in 1892 Pinard, of Paris, and Harris, of Philadelphia, brought it before the world.

Anatomy: The following anatomical points should be understood before attempting the operation:

The pubic joint is generally a little to one side of the median line, and is sometimes ossified; its length is one and a half by one and three-quarter inches; its width is a little less than one-half inch, while its thickness is about the same.

The superior ligament is thin; the posterior little more than thickened periosteum, but the anterior ligament is quite thick, and the inferior or sub-pubic ligament is about three-eighths of an inch vertically and of nearly the same thickness; it fills in the upper part of the sub-pubic angle and runs down the superior border of each descending ramus of the pubes. This ligament should be cut in symphysiotomy, as otherwise not only it, but the neighboring tissues are liable to be torn when the joint is made to separate.

The two opposing portions of the pubic bones which make this joint are separated by a disk of cartilage which is thinner behind, and marked by a fissure. Although the center of the disk is soft, the joint has no real synovial membrane, but serous infiltration occurs during pregnancy and softens the cartilage so that the bones become more separated, and motion at the joint can be demonstrated before and after labor. As the bone surfaces of the joint are further apart anteriorly, the joint can be easier opened from in front than behind.

The sacro-iliac joint need not be described, but it must be remembered that even during labor its motion is very limited, and that if the pubic joint is separated during labor more than three inches, the anterior ligaments of the sacro-iliac joints are liable to be broken. The non-puerperal cadaver may not allow a separation of from one and a half to three and a half inches without laceration of the anterior ligaments, but in the puerperal cadaver three and a half inches separation does no harm.

The incision just above the symphysis for the introduction of the finger or knife behind it, must be made vertically, for if made transversly a portion of the attachment of the oblique, rectus, and the pyramidalis muscles would be severed, and thus

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interfere with their holding the pubic joint in place after the operation.

The structures involved in the operation are the thick elastic adipose tissue of the mons veneris and its vessels, the pubic joint, and the cellular tissue behind the joint. As the peritoneum is not attached to the abdominal wall for at least two and a half inches above the symphysis, this structure needs no further consideration. The cellular tissue behind the joint is easily separated from the pubes, and this separation of the connective tissue which holds the bladder and urethra in place is the only way in which the bladder and urethra should be involved in the operation; but when it is not performed properly—i. e., carefully—the bladder, urethra, or vagina may be ruptured, and the clitoris has been torn from its attachment when the operator was cutting the sub-pubic ligament.

The effects of separation of the pubic symphysis on the diameters of the pelvis are marked. A separation of two and a half inches at the pubic joint, which is absolutely safe, is estimated to increase the antero-posterior diameter of the inlet about three-quarters of an inch (Jewett). This gain is due, not only to the separation of the symphysis, which increases the diameter nearly one-half inch, but also to the head falling in between the separated symphysis and the ends of the pubic bones moving downward and outward from the sacro-iliac joint rotating "upon an oblique line running from above downward, and from without inward." (Jewett.)

The transverse and oblique diameters are increased from three-quarters to one and one-half inches (G. and J.).

While two and a half inches is given above as the absolutely safe separation of the pubic joint, it must be understood that although it is not known just how much separation of the pubic joint the sacro-iliac joint will stand, it is considered safe to separate it three inches or even a little more if done carefully and absolutely indicated, for if the pelvis of the puerperal cadaver will stand this, the dynamic pelvis should also.

The value of pubotomy can best be understood by considering its indications, contra-indications, complications, mortality, after effects, and its value as compared with other operations.

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Indications: The indications for symphysiotomy are as follows:

First—Where the relations between the size of the fœtal head and the maternal pelvis are such that nature or the forceps will not deliver a living child, and where the separation of the symphysis will increase the diameters sufficiently to allow the extraction of the head. Examples:

a. A general contracted pelvis whose antero-posterior diameter of the inlet is at least three and a quarter inches.

b. A flat pelvis whose antero-posterior diameter is not less than two and three-quarters inches. (This diameter is sufficient, because the transverse is not proportionately shortened.)

c. The kyphotic pelvis is mentioned as an indication, but the minimum diameter is not given.

Second—Where the relations of the presentation or position of the fœtus to the pelvic canal are such that nature, forceps, or version will not result in the expulsion of a living child. Examples:

a. Certain face presentations with or without posterior rotation of the chin.

b. Vertex presentations with posterior rotation of the occiput.

c. Brow presentations.

Third—In an absolutely contracted pelvis to aid delivery by an embryotomy on the dead fœtus.

Fourth—Consent of the patient or her nearest relative.

Fifth—Absence of fœtal or maternal exhaustion.

Sixth—Complete dilatation of the cervix or the cervix in a dilatable condition.

Seventh—Presence of facilities for perfect asepsis.

Eighth—Pelvic tumors, either hard or soft. (Symphysiotomy is here said to give fine results.)

Ninth—Prolonged labor with dangerous contractions—the forceps to be used to dilate the cervix by pulling the head gently downward. This indication seems indefinite.

It must be especially remembered that symphysiotomy is indicated in all cases where previous forceps deliveries had resulted in still births.

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Contra-indications: The contra-indications for this operation are:

First—Ankylosis of the sacro-iliac joints and therefore in Robert's and Naegele's pelves.—(A. J. B. of O.)

Second—Oval oblique pelvis.

Third—Dead fœtus, as a rule.

Fourth—Primipara, as a rule, for the reason that whether or not this operation is indicated depends not so much upon the size of the pelvis as it does upon the relative size of the fœtal head to the size of the pelvis. Now, this relation can only be told by the expert in pelvimetry and cephalimetry. Before resorting to symphysiotomy, the pelvis should be measured externally and internally; the head should be measured through the abdominal wall by the pelvimeter, its relative size estimated by a vaginal examination, and the head pushed into the brim or made to engage by careful traction with the forceps.

Complications: No complication should result during this operation if proper care is taken. It must not be forgotten, however, that bony ankylosis may be present, and the absence of bony ankylosis of the sacro-iliac joint should be diagnosed before undertaking the operation by "strongly flexing and extending the thighs and rotating the knees outward." Bony union of the pubic joint only complicates by necessitating the use of the saw.

The complications which have occurred during and after the operation are:

Fistula of the urinary tract.

Laceration of the vagina.

Separation of the clitoris and urethra.

Sacro-iliac or sacral pain.

Difficult locomotion.

Severe hemorrhage, and

Puerperal infection.

The statistics of to-day show that all of these but puerperal infection and hemorrhage are rare, and that difficulty in locomotion is not much more marked than after difficult forceps cases, or even normal labor, if we except only one or two cases that have been reported. Excessive hemorrhage has occurred

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frequently when the sub-pubic ligament was cut, but this is considered to be the fault of the operator. Hemorrhage is said to be liable when the symphysis is incised by the open method, but a little care would probably prevent this.

Mortality: The mortality of the operation in elective cases has not been, of late, more than 2%, and to-day, with skilled operators and asepsis, it is nil. In non-elective cases the mortality is 10%.

The fœtal mortality is estimated at 25%; and while this is greater than that of Cæsarian section, we must remember that, as an editorial in the American Medico-Surgical Bulletin states, symphysiotomy takes the place of premature labor, where the mortality is much higher, and of craniotomy.

I wish to prophesy that the future will show, with an elective case and no unsuspected complication occurring during labor, that the maternal and fœtal mortality from spmphysiotomy will be no more than that from natural labor, or, at the greatest, elective forceps cases.

After-effects: The after-effects of the operation have been given above as complications. They are sacro-iliac or sacral pain, difficult locomotion from non-union of the pubic joint, and septicæmia. These should all be absent in properly conducted elective cases.

Relative value: The value of pubotomy as compared with other operations: Considered in the light of the present method of operating, symphysiotomy, when indicated, is to be preferred to the improved Cæsarian section and Porro's operation, because the maternal mortality in the latter is greater though the fœtal is less; because it can be performed in the house of an ordinary patient; and because it does not require as skilled an operator. It is to be preferred to embryotomy or premature delivery, where the maternal mortality is about the same as in symphysiotomy, because the fœtal mortality is much less.

The Technique of the Operation: The instruments and dressings necessary for the open method are a scalpel, a metallic catheter or a uterine sound, artery forceps, needle holder, needles, silkworm gut, ordinary antiseptic dressings, and hip bandages. Wide strips of adhesive plaster to aid in holding

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the hips in place are considered very efficient, but they are not essential. The simplest hip bandage is a flannel one made with many tails to tie in front. Leather bandages and the like are unnecessary.

In the closed method a blunt-pointed, slightly curved bistoury is also required, and in ankylosis of the joint a chain or small pocket-case saw will be required.

Perfect antisepsis of the doctors, nurses, and instruments, and of the patient is absolutely necessary, and the surroundings should also be aseptic if possible. This antisepsis is to include the swabbing out of the vagina with soap and water, and the emptying of the bladder and bowels.

An anæsthetic is given. It is of good advantage to begin the anæsthetic before completing the patient's antiseptic toilet, as then the latter can be more perfectly carried out under your supervision.

I will describe this operation in the manner in which it can best be performed in a private house. The patient is placed crosswise of the bed as in a forceps case, but the feet are placed each on a chair. One or two assistants support the hips. After a metal catheter or a uterine sound has been introduced into the bladder and the urethra and bladder drawn away from the joint, a longitudinal incision above the symphysis is made in the median line large enough to admit a finger, which is passed down behind the joint by separating the loose attachment of connective tissue here (which aids in holding the bladder in position) until the sub-pubic ligament is reached. In the subcutaneous method, the slightly curved probe-pointed bistoury is introduced along the finger behind the joint until the sub-pubic ligament is reached; then this ligament and the joint is severed by cutting upward and forward. In the open method, the integument incision is prolonged downward sufficiently for the joint and sub-pubic ligament to be severed, either by cutting from above downward and forward (the method we used), or from in front downward and backward, using the finger or a piece of flat zinc as a director upon which to cut. The subcutaneous method is preferred by the majority; but some, including Pinard, consider the open better, because the joint can be got at more freely, and is easier opened. The

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open method increases the dangers of hemorrhage and sepsis, and cases of hemorrhage arising from an incision involving the clitoris are considered quite difficult to stop. Probably the incision can be more rapidly made by the closed method, but there must be more difficulty in cutting the sub-pubic ligament. Each operator should be allowed to use that method which seems the easier to him until the future proves which really is the best.

The catheter is now removed and the thighs carefully separated until the pubic bones have parted the required distance. Either the forceps or version should now be used and the fœtus carefully delivered, care being used not to further separate the thighs and thereby the joints, and also not to bring too much pressure against the region of the bladder and urethra. This pressure can be prevented by pressing the head against the perineum. As soon as the fœtus and placenta are expelled, the catheter should be reintroduced into the urethra and traction of the parts away from the joint repeated while the hips are gradually compressed, the thighs rotated inward, and the joint thereby closed. It is of great importance that the one who holds the catheter be very careful to keep the bladder and urethra out of the joint as it is being closed, for otherwise there will be pinching and subsequent fistula. No osseous sutures are used. The integument is closed by strong silkworm gut sutures, the usual dressing applied, and then a many-tailed bandage put on around the hips to prevent separation of the joint.

After-treatment: The after-treatment is similar to that after an ordinary confinement, except that the catheter may have to be used two or three times, and the patient kept on her back the first week, and in bed until the end of the third week. Changing the hip bandages should be done carefully, so as not to allow separation of the joint. It would be advisable to move the patient carefully onto her side once a day, even in the first week, if it did not cause pain, as this would greatly relieve her, and thus keep her general condition better, provided the wound be guarded from the lochia.

It is considered that for this operation to be successful, the operator must be one of skill. The best way for a young oper-

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ator to become skilled in any operation is to first study the literature on the subject, then to perform the operation on dogs and cadavers, and then to assist or perform the operation on the patient. Hence, after reading the technique of symphysiotomy, I operated on a dog. I found the joint ossified, so I sawed through one of the pubic bones. The dog made a perfect recovery. I next operated on a female cadaver. I succeeded all right, except that I followed some of the earlier instructions, and cut through the sub-pubic ligament by following down one of the pubic rami. This resulted in my cutting into the clitoris and lacerating it considerably. I next assisted Dr. Buchtel in performing the operation in a case of contracted pelvis, and then performed the operation myself in a similar case. These two cases I will now report:

Case No. 1—Patient a Russian Jewess, age 23, with a contracted pelvis—i. e., a flat pelvis. Pelvimetry showed the pelvis to be abnormally wide, with the true conjugate diameter only three and a half inches. The normal is four and a quarter inches. [Distance between anterior superior spines, 9 1-4 inches +; between iliac crests, 10 1-4 inches +; external conjugate, 6 3-4 inches; diagonal conjugate, 4 1-8 inches; circumference, 31 inches. Taking 3.1 inches from the external conjugate gives the true conjugate 3.65 inches, as also does taking .5 inch from the diagonal conjugate.] The patient gave no history of rickets. The first two children were delivered by forceps, with the result that the first child was still-born, and the second died in two days from effects of the labor; and that after the first child the mother suffered from peritonitis and paralysis of the lower third of the right leg, and after the second child, peritonitis. The patient got up on third day, and cried about death of child, and temperature was 105 for three evenings.

At the third labor, as soon as the cervix was completely dilated, Dr. Buchtel, assisted by myself, performed symphysiotomy, using the open method, and delivered a living child by means of the forceps. The sub-pubic ligament was only nicked! The symphysis separated a finger's breadth. Following this labor the highest temperature after the first day was 100.2. On the evening of the first day the temperature was 101.5. The incision was infected by the patient scratching, and although it

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puffed up some, it was perfectly healed at the end of three weeks. The patient was up on the sixteenth day, but slight motion was felt at the joint until the end of the first month. Subsequent history of mother and child normal.

I wish to state that Dr. Buchtel and myself also attended the first two labors, and that the condition of the patient after all three confinements was greatly due to the septic surroundings and ignorance. The patient would remove the bandage about the hips and the dressing from the wound to scratch it because of itching.

Case No. 2—Patient a German by birth, age 32; said to have had double joints (rickets) during childhood, but otherwise very healthy. Her first labor was normal, except an early escape of the liquor amnii, and a living child was born. The fourth child was large, and necessitated the use of the forceps, but was born alive. The second and third labors were instrumental, and the children still-born. The puerperal state after each labor was normal. For her fifth confinement I was engaged. By pelvimetry I found the pelvis to be wider than the average, but the external conjugate a little small. [Crests, 11.4 inches; spines, 11 inches; external conjugate, 7.4 inches; which, upon subtracting 3.1 inches, gives the true conjugate as 4.3 inches, which would be about the normal size; but by internal examination during labor, promontory seemed to project more than normally.] During the fifth confinement there were no pains until the last two or three hours, but before this, for two days, there had been a bearing down sensation and a gradual dilatation of the cervix. The presentation was L. O. A., with the head in the right iliac fossa. Later, after pains had begun, a hand was found beside the head per vagina, but this was corrected by pushing the head into the brim of the pelvis. When the cervix was nearly dilated the membrane ruptured and the umbilical cord prolapsed into the vagina. As the pulsation in the cord stopped at once, and because the patient was very desirous of having a living child, I performed version and delivered trunk and arms easily, but could not remove the head. (The removal of the head in previous versions had never bothered me.) I partially decapitated the head, but as the patient's hemorrhage was excessive from separation of the placenta, and

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lessened when the head was held firmly in the pelvis and the uterus grasped tightly, and because I had no craniotomy instruments with me, and being far from assistance, I decided to perform symphysiotomy, as otherwise the patient would die of hemorrhage. I incised the pubic joint by the open method, using my finger behind the symphysis as a director, and a finger of my assistant, Dr. Thursa Wintermeyer, in the vagina, to press the urethra to one side, as I could introduce the sound into the urethra only a short distance because of the head being in the pelvis. I cut through the sub-pubic ligament completely, and the symphysis separated about one inch, and the head dropped out of the pelvis. After the labor the patient was attended by her husband. At first she was very weak, pale, had a weak pulse of 120, and cold extremities, the result of the loss of blood during confinement, but her strength gradually returned. During the first two weeks she had some septic infection of the uterus, and probably a mild cellulitis, for she had a temperature of 101 on the third day, and 102 on the seventh day; at first some tenderness and pain in the lower abdomen, and later, when she turned, it caused pain in the uterus and sides of pelvic cavity, but not at symphysis. On seventh day chills, but washing out uterus with a hot boric acid solution stopped these, as well as tenderness in pelvis, except in region of bladder and urethra, where some tenesmus continued until the sixteenth day. The patient sat up the twelfth day to the sixteenth day, and although she could lift her pelvis in bed, standing on her feet caused pain to shoot from hips to pubes. On seventeenth day infection of the pubic incision from partial separation of the same, due to patient standing on her feet; temperature, 101.4, and no tenderness about uterus. Boric acid was applied to the wound and on the twentieth day all the pus was removed by rubbing the incision with absorbent cotton soaked in a saturated solution of boric acid. Then the incision was covered with castor oil and bismuth in the form of a thick paste. This dressing completely stopped any further suppuration. On the thirtieth day the patient was up a little; temperature 99 and pulse 94. On thirty-fourth day the patient could walk, but lifting up leg to go up a step caused pain in groin and above pubic joint, but no motion at joint. This is

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probably due to irritation produced by the motion of the iliopsoas muscle along the brim of the pelvis. On the forty-seventh day, temperature 105.3. This was probably brought on by her washing some clothing three or four days before, for she began to feel sick and the next night and day she flowed some. I washed out the uterus and gave cathartics, and in five days her temperature was normal and she was up, but weak. A month later she had only a slight bearing down in the region of the bladder.

Deductions: The first case shows that a living child can be extracted with forceps after symphysiotomy, where with forceps alone we would have a still-birth.

The second case tends to prove that symphysiotomy is a better and a simpler operation than craniotomy when there is excessive hemorrhage.

Both cases prove that symphysiotomy can be performed at a private house without seriously endangering the patient's life, even when the surroundings are not aseptic; that symphysiotomy is applicable to the vertex and breech presentations; and that infection of the incision when the soft parts have not been injured is not necessarily serious, and that continuous and tight bandaging of the hips is not absolutely necessary; that the strongest sutures, viz., silkworm gut, should be used, so as to prevent opening of the wound; that the after effects of a labor are not much increased by the operation of symphysiotomy.

Remarks: The septic inflammation and cellulitis which were present in the second case were probably due to the traumatism induced by trying to deliver the head, and also to the weak condition of the patient preventing the uterus from properly shedding or absorbing the remaining portion of decidual tissue at the placental site, and allowing those germs present a chance to multiply.

In the second case it probably would have been much better for the mother if I had not performed version; but as the previous children had been delivered by forceps, I thought this one could be by version.

While a prolonged first stage in patients with a normal pelvis does not seem to impair the vitality of the fœtus, a pro-

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longed first stage in a patient with a contracted pelvis seems, almost invariably, to result in a still-born child. The reason of this is, probably, that the contractions do not cause the effect on the cervix that they would in a normal pelvis, but rather tend to act on the uterus as a whole, and hence compress the fœtus and more or less detach the placenta, and thereby lessen the fœtal circulation.

SUPERNUMERARY OVIDUCTS, AND TYPICAL HYDATID OF MORGAGNI, WITH A LARGE FIBROID TUMOR—HYSTERECTOMY.

H. G. WETHERILL, M. D., DENVER, COLO.

The specimen I present for your inspection was removed from a patient now in St. Anthony's Hospital, on Monday, May 25. Convalescence uneventful.

The tumor is of the uterus—a multiple fibro-myoma of large size, which was removed by hysterectomy (supra-vaginal amputation), and presents anomalous oviducts. It also has attached to the fimbriated end of one tube a hydatid of Morgagni with unusually long pedicle.

In various text and reference books I find allusion to a supernumerary *ostium abdominale* of the oviduct as a not uncommon anomaly; in a gynecological experience extending over some years, however, this freak of nature has not before presented itself, and the fact that it does sometimes occur seems to be little known.

The following, from Quain's Anatomy, refers to it, but in the specimen here shown there are two distinct supernumerary tubes with well defined fimbriated ends, which seems to be more than the "smaller fimbriated openings" Quain* alludes to:

"Varieties"—"A pedunculated cyst, known as the *hydatid of Morgagni*, apparently peritoneal in origin, is frequently found attached to one of the fimbriæ of the tube itself." *"A second smaller fimbriated opening not infrequently occurs at a short distance from the main one."*

Examination of this specimen shows two extra oviducts (one on each side), just below and in front of the normal ones.

* Quain's Anatomy, Vol. III., Part IV., page 271.

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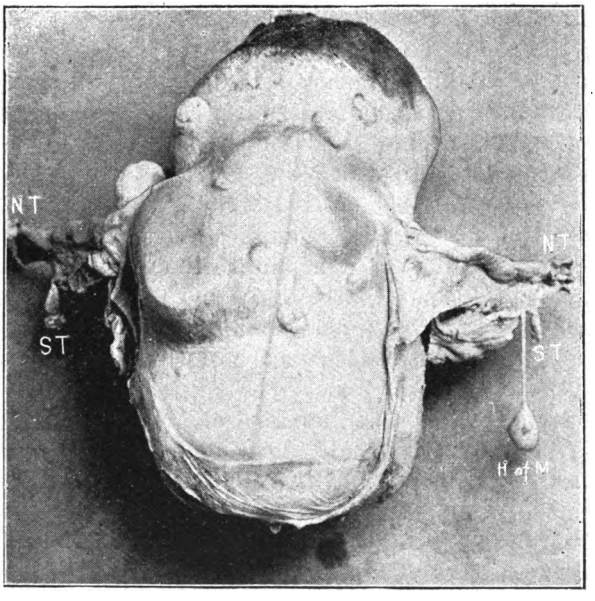
The tube may be traced in its course through the broad ligament by holding it up to the light, when it is seen to run parallel with the normal tube almost to the wall of the uterus. Its fimbriated end is patulous, but quickly contracts and the lumen is lost.

The diameter of the appendage is about one-quarter inch on the right side, and somewhat less on the left. The free end



N T — Normal tube.
S T — Supernumerary tube.
H of M — Hydatid of Morgagni.

is one inch long on the right side, and three-quarters of an inch on the left, both being abundantly fimbriated, and with a distinct neck or isthmus near the end.

The hydatid of Morgagni is attached to the left normal oviduct and is two and a half inches long.

The uterus is not bicornate or abnormal in its development in any other particular.

The photograph shows quite well the nature of the abnormality, the pedunculated hydatid of Morgagni, and the character and extent of the fibroid growth.

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TWO CASES OF CUTANEOUS VASO-MOTOR NEUROSIS WITH SPECULATIONS THEREUPON.

G. H. STOVER, M. D., EATON, COLO.

The first is that of Baby K., female, aged ten months. The mother found the child on the floor with a salt dish emptied out before it, engaged in spitting salt from its mouth; on picking the child up, she noticed a change in its face which frightened her, and she brought the little one in to me. Its face presented a most striking appearance; the nose, the concave surface and lobe of the ear, and a space at each angle of the mouth were of a marble whiteness, while the rest of the face was of a vivid scarlet color. I directed a warm bath to be given, and after a few hours no trace of the difficulty remained. I shall not discuss this case at length, as the consideration of the next one will contain hints for this; but will only say that we have here a vaso-motor spasm, seemingly due to contraction of the superficial vessels in some places and dilatation in others, possibly due to varying action of vaso-motor fibres of the cervical sympathetic.

The second case is an instance of angio-neurotic œdema, occurring in Baby M., female, aged one and one-half years. The father is a physically healthy laboring man of average size, aged about 28 years; does not drink; uses little tobacco. The mother is a plump, healthy appearing woman of about 25 years. After the birth of this child (the only child) she is said to have been insane for a month or so, but I cannot learn much as to her symptoms at that time. In 1895, after an attack of la grippe, she had a pronounced hysterical attack, which I witnessed.

The child is of average size, apparently well nourished, and of normal outward appearance. It is often subject to digestive disturbances, frequently, I suspect, the result of improper feeding. It has had no serious illness. It used to wake suddenly in the night and cry as if in fear; this symptom, together with a number of "old women's signs of worms," led the parents to surreptitiously administer a vermifuge, but without result. The child's head was formerly noticed to perspire a good deal. When it was a year old, as no teeth had appeared, I examined

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its body; found the anterior fontanelle distinctly too large; no signs of teeth, no squareness of head, no cranio-tabes, no rickety rosary, no deformity of the long bones. A few weeks after beginning the use of lacto-phosphate of lime the teeth began to erupt and the nervous symptoms to disappear. Several months after this, during a mild stomatitis, there was observed a tendency of the lower gum to grow up on the incisors. On two occasions I have observed in this child an apparent drug eruption—once while taking sodium bromide, and once after the administration of some coal-tar derivative by another physician.

The attack of œdema appeared suddenly in the morning; it was first a thickening of the right superciliary tissues, upper and lower eyelid, and bridge of the nose, the right cheek in part, the right upper lip, and in spots upon the right side of the neck. The mucous membrane of the nose, larynx, and pharynx was not affected. There was a considerable thickening of the skin, of a rather brawny feel, and of a slightly heightened color. There was no increase of the axillary temperature or of the pulse rate; the lesions did not appear to smart or itch; there was no increased secretion of saliva; in fact, the child appeared to feel perfectly well when I saw it, at 10 a. m., though its mother said it had vomited in the morning and had been fretful. It was slightly constipated. The treatment consisted solely in the administration of small doses of Rochelle salts. In the evening there were no traces of œdema, and I was told that it had not affected any parts other than those mentioned above. The urine was not examined.

It will be observed that the œdema was almost entirely confined to the right side, although the median line did not form an absolute line of demarcation, for the left side of the upper lip near the median line was involved continuously with the œdema of the right side, and the swelling of the neck did not quite approach the median line; but it was practically a unilateral swelling.

Close questioning did not reveal a definite immediate cause; the mother denied any imprudence in the child's diet, though of course this is somewhat open to question. No illness followed.

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In this case, then, we have parentage neurotic on one side; a digestive system somewhat easily deranged; a tendency toward skin eruptions; perhaps a biological defect in osseous cell growth; thus lending support to several of the theories as to the origin of angio-neurotic œdema. In a paper read December 15, 1895, before the Chicago Academy of Medicine, Dr. Wm. L. Ballenger summed up the etiology as follows: Heredity; previous and present condition of disordered health; overwork, either mental or physical; exhaustion from disease, exposure, or exertion; neuropathic taint.

I will call your attention to the fact that both the above cases were in females.

It seems to me that the above causes, except the neuropathic taint, are merely predisposing factors rather than distinct causes; that their effect is to render effective some latent condition which manifests itself in different ways, one of them being an œdema of the type under consideration.

A noticeable feature here is the distinctly unilateral distribution; this would strongly indicate a nervous origin. Perhaps we may consider this œdema as being due to a relaxation in the tonus of the muscle walls of the capillaries, thus permitting an increased volume of blood in the skin, with probably some transudation into the lymph-spaces.

Now, as to the mechanism which acts to produce this œdema: The more I have considered the possibilities, the less am I able to settle with entire satisfaction upon any one of them. If the swelling is caused, as seems most reasonable, by either an excitation of the vaso-dilator, or an inhibition of the vaso-constrictor nerves acting upon the capillary walls, it is a hard matter to decide definitely which nerve bundle is at fault. Vaso-dilator fibres are found in the chorda tympani and its lingual branch—some in the seventh cranial nerve, some in that branch of the glossopharyngeal which supplies the parotid, and Foster says that the trigeminus apparently carries dilator fibres for the eye, nose, and other parts. Vaso-constrictor fibres for the head pass through the upper dorsal nerves to the cervical sympathetic, thence to the skin, mucous membranes, and certain glands, and it is stated by some and disputed by others that the cervical sympathetic also carries vaso-dilator

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fibres. In the case under consideration we may exclude vaso-dilator action by the chorda tympani, lingual branch of the seventh, and glossopharyngeal, because there was no increase of saliva, and no swelling of the tongue. *If* the trigeminus has dilator fibres for other parts than the eye and nose, *perhaps* it has been the medium involved. It is doubtful if excitation of dilators in the sympathetic (should any exist) could act, for it has been experimentally proven in general, that the constrictors, when a nerve is not degenerated, respond more readily to a stimulus than do the dilators. An inhibition of constrictor action might account for the lesion, and because of the presence of flushing of the skin, that is to me the most reasonable explanation. If we may explain the first case cited by a paradoxical action of cervical sympathetic branches, permit me to theorize as follows: The efferent impulse is of a compound constitution; when it reaches the terminal ramifications of the superficial vaso-motor nerves, it is resolved into its elementary constituents; owing to minute variations in the excitability of the nerve fibrils, we have at one point an action of an excito-constrictor element, at another an action of either an excito-dilator or an inhibito-constrictor element. The œdema observed in the second case may be considered as a reflex sign, due originally to a disturbance in the digestive system, the path of the impulse being from here to the vaso-motor center in the medulla, then reaching the cervical sympathetic through the anterior spinal nerve roots; or it may have been due to a toxin derived from the sluggish bowel, acting through the circulation upon the medullary vaso-motor center.

I do not think that these cutaneous disturbances can properly be looked upon as distinct disease entities, but as merely symptoms or signs of a general pathological condition; not *essentially* symptoms of rachitis, or gastric, or intestinal disease, or of gouty diathesis.

I believe them to be nervous manifestations of a primary pathological cell condition; a condition which is at the back of many of the idiosyncracies; and which, as our knowledge of pathology is increased and systematized, will claim as mere symptoms many of what we now consider to be distinct diseases or dyscrasiæ.

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DISCUSSION.

Dr. H. T. Pershing—I think that the general conclusion of this paper, that vaso-motor disturbances are evidence, not of any special disease, but of a general instability of the central nervous system, is entirely correct. We find vaso-motor symptoms most prominent in those diseases marked by a general instability of the central nervous system, particularly in neurasthenia and in hysteria; and we have symptoms due both to vaso-motor paralysis and to vaso-motor spasm. This is not to be wondered at, when we remember how easily the vaso-motor nerves are influenced in health; how, under the variation of even slight emotional conditions, there will be a corresponding change in the arterioles, some emotions causing pallor, and others flushing. In both the cases reported in the paper, heredity is the most important predisposing condition. The fact that the mother of one baby had a typical attack of hysteria is very significant to me in interpreting the condition of the child.

Dr. J. T. Eskridge—There is nothing in which speculation is so rife as in the attempt at explaining vaso-motor troubles. In this respect there seems to be analogy between the use of potassium iodide for therapeutic measures, and that of the term vaso-motor neurosis for purposes of diagnosis. It seems to be the custom with some physicians, at least, if they have a difficult case and are in doubt what to give to administer, potassium iodide; so in puzzling cases of nervous diseases, the term vaso-motor disturbance is employed to explain whatever seems obscure. That the vaso-motor system has much to do with metabolic processes and its disorders cannot be doubted. The numerous ganglia and sympathetic nerve fibres distributed throughout the body are directly concerned with the size of the capillaries, and thus immediately preside over nutrition. The condition of the ganglia is to a certain extent affected and controlled by the spinal cord; further, all the vaso-motor nerves of the body are presided over by the cerebral cortex. Irritation of the latter, or affections of the cord, or disturbances in the ganglia or sympathetic nerves may produce various vaso-motor derangements. So delicate is the mechan-

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ism of the vaso-motor system that its normal workings may be disturbed, and yet no apparent cause can be detected. I had hoped that by the neuron theory many of the obscure functional diseases would be explained. Whether they will or not remains to be seen. So far this theory has aided us very little in this direction.

Dr. Stover—I have nothing to add to my paper except to say that I hoped for a discussion of my proposition as to the compound nature of the nervous impulse. I have in my mind likened that somewhat to the—perhaps not a perfect analogy, either—electric current in duplex telegraphy, in which several messages are sent over one wire at the same time, owing to co-existing differences or variations in the electric current itself, or in the receiving apparatus; and in the first case which I mentioned, in which we had in one place a constriction and in another a dilatation, possibly we might think of a similar condition in the nervous impulse, where it would act in one way on some of the terminal branches of the main nerve, and in another way on others, thus producing different effects in the ultimate distribution of the same nerve.

DIAGNOSIS OF TUMORS OF THE BRAIN.

J. T. ESKRIDGE, M. D., DENVER, COLO.

At the last annual meeting of this society I presented a brief resumé of a rather lengthy paper, entitled "Diagnosis of Chronic Abscess of the Brain." To-day I desire to call your attention to the diagnosis of tumors of the brain.

Asepsis and antisepsis have not only enlarged the field of usefulness of the surgeon, but they have increased the responsibility of the neurologist. He has no longer done his duty when he makes a diagnosis of tumor of the brain, gives anti-syphilitic agents, sees a few cases improve, and sits down with folded

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hands waiting patiently for an autopsy to confirm the correctness of his clinical observation. Accuracy in the diagnosis of intra-cranial lesions, and precision in localization are now demanded of him. If he is unduly hesitating in his opinions and regards his own reputation more than the welfare of his patients, thus failing to recommend surgical procedures when science and humanity demand them, he becomes a medical parasite, and is unworthy of the little remuneration which perchance may come to him. On the other hand, if he is over-confident and rash, and advises surgical measures without having first studied his cases thoroughly and systematically, he necessarily causes lives to be sacrificed prematurely, and brings the surgeon, as well as himself, into disrepute. The neurologist, like the surgeon, must be bold but conservative, thoroughly scientific and intensely practical.

IS ORGANIC DISEASE OF THE BRAIN PRESENT?

In investigating all cases of suspected disease of the brain, the first question to determine is, are the symptoms due to organic disease of the brain, or to perverted function? An accurate chronological history of all points relating to the patient's health from infancy up to the present, together with family predispositions, should be obtained. Then should follow a searching, thorough, and systematic examination. No symptoms detected by the examination should be considered too trivial to be recorded. Not infrequently the things that at the time they are detected seem so insignificant are the ones by which the diagnosis is clinched.

The symptoms of perverted function of the brain at times so closely simulate those of an organic nature, that but few of the latter, when taken by themselves, can be relied upon to confirm the diagnosis. Symptoms that are usually regarded as of organic origin, when due to perverted functional disturbance are, as a rule, temporary and fleeting in character, and the opposite, while true in the vast majority of cases, finds a notable exception in multiple sclerosis of the brain and cord. Pronounced muscular wasting, especially in the distal portion of a

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paralyzed limb of cerebral origin, associated with flexor contracture and decided increase of the deep reflexes in the affected limb over those of the corresponding limb of the opposite side; wasting of the muscles of the face, with reactions of degeneration, not due to extra-cranial lesions; most cases of permanent paralysis of the ocular muscles; "crossed paralysis;" marked trophic disturbance in one or both eyes; more than transient hemianopsia, sensory aphasia or motor agraphia, may be regarded as of organic origin, although only one of these conditions alone exists.

The presence of other and more frequent symptoms is always very strong evidence of organic brain disease, but no one of them, except under certain conditions, can be accepted as positive proof of it. Among these, the most constant and the easiest to detect is optic neuritis, or choked disk. It is usually double, but in exceptional cases it is unilateral. Optic neuritis occurs in from 80% to 90% of all cases of intracranial tumor. It is least frequent when the growth is in the motor convolutions and in the centrum ovale of the motor area and the frontal lobe. It is probably most frequent in connection with tumors of the cerebellum, of the great ganglia at the base, and of the convolutions in the anterior portion of the frontal lobe. Tumors in the motor convolutions, according to the statistics compiled by Edmunds and Lawford,[1] are rarely attended by optic neuritis, but in meningeal growths in the same situation, it is found in 80% of the cases. While choked disk is always in favor of organic disease of the brain, and especially of tumor, we must bear in mind that it may be caused by renal disease, lead encephalopathy, and profound anæmia from various causes.[2] Decided hyperæmia and an œdematous appearance of the optic disks have been observed from uncorrected refraction errors. Certain menstrual disorders have been charged with producing changes in the optic neuritis. The subsequent histories of some of the latter cases seem to support the view that the intra-

[1]Quoted from Dr. De Schweinitz, University Medical Magazine, March, 1896, page 418.

[2]It is probable that the case of choked disk observed by J M. Da Costa in a patient addicted to the chloral habit, was in reality due to the impoverished state of the blood. The same may be true of lead encephalopathy. See University Medical Magazine, March, 1896, page 430.

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ocular inflammation may be due to internal hydrocephalus or localized basilar meningitis.[1]

Renal disease and lead encephalopathy may give rise not only to optic neuritis, but to other important symptoms of organic brain disease, such as headache, vomiting and convulsions, and in addition kidney disease may be attended by hemiplegia. In view of these facts, it is important to consider the points in the differential diagnosis between choked disk as found in cases of organic disease of the brain, and as observed from other causes which may produce it.

Optic Neuritis from Organic Disease of the Brain, Especially Tumor—The only form of organic brain disease in which choking of the optic disks is typically prominent, with few exceptions, is tumor. The change in the disks is not, as a rule, an early symptom. It usually begins first in one eye and remains for some time more advanced in this eye. After swelling of the disks is first manifest, the choking takes place quite rapidly, so that a few days are sufficient for the center of the disk to be raised enough to require a plus glass of two or more dioptres to see it distinctly. The disks may continue to increase in prominence until a plus glass of four, five, or more dioptres is required to get a good view of them.

Optic Neuritis from Bright's Disease—The swelling of the disks is not usually very great, and in the vast majority of cases, the albumen and tube casts in the urine, the hypertrophied left ventricle of the heart, the increased resistance of the pulse, and the general appearance of the patient aid in establishing the diagnosis of renal disease. The presence of albuminuric retinitis is always positive evidence of Bright's disease, but Dr. De Schweinitz has recently recorded a case of tumor of the cerebellum in which there was optic neuritis and star-shaped macular figure simulating the appearances seen in albuminuric retinitis.[1] The kidneys were normal in this case. According to Marcus Gunn, from whom Dr. De Schweinitz quotes, Dr. James Taylor was the first to

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[1]Intra-cranial tumors. Bramwell, page 131.

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call attention to the cases in which a star-shaped macula, due to tumor of the brain, simulated albuminuric retinitis, and further, that the macular figure was apt to occur when the optic neuritis was significant of a cerebellar tumor. In a case, then, of the peculiar form of retinitis to which Taylor, Gunn and De Schweinitz have called attention, the presence of symptoms significant of cerebellar tumor, and the absence of all clinical evidence of Bright's disease, one might be justified in making a diagnosis of tumor, notwithstanding the appearance of the eyes, save the prominence of the disks, as revealed by the ophthalmoscope, might be similar to albuminuric retinitis. Occasionally the appearance of the choked disks from kidney disease is identical with that which usually occurs from an intracranial growth. I have observed one such case in a patient seen at the Arapahoe County Hospital, in consultation with Dr. H. W. McLauthlin. The difficulty in diagnosis in this case was only apparent, because of the presence of the numerous other symptoms of the kidney affection. Unfortunately, at the autopsy in the case just referred to, the brain was not examined. It should be remembered that a person who is suffering from kidney disease may be the subject of a cerebral growth, and *vice versa.*

The form of Bright's disease most commonly associated with optic neuritis is the chronic cirrhotic variety, in which no albumen may be detected for days or possibly weeks at a time, and the tube casts may be so few as to be easily overlooked unless one is on his guard and examines repeatedly for them. But in such cases the increased quantity of the urine passed in twenty- four hours, its low specific gravity, the condition of the heart, pulse and vessels, should make one cautious, and cause him to defer giving a positive opinion until ample opportunity is afforded for a thorough investigation and study of all the clinical symptoms.

Optic Neuritis from Anaemia—Choking of the optic disks is less pronounced and is more gradual in its development from

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[1]George E. de Schweinitz; Nervous Diseases by American Authors, page 758, and University Medical Magazine, March, 1896, page 420.

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anæmia than from intra-cranial tumors; but these guides do not hold good in differentiating the condition from the optic neuritis that may occur from other organic lesions of the brain than tumor. In anæmia, however, the extreme poverty of the blood, the pronounced general symptoms of the blood state, and the condition, as observed, usually occurring in young females, should prevent a hasty diagnosis. It is generally stated that optic neuritis of hæmic origin is unattended by local symptoms. This is probably true in regard to loss of motion or sensation in a part; but in one case of optic neuritis, recently observed by me, in which the poverty of the blood was very marked, a persistent localized pain was present and limited to a spot not larger than a silver dollar, in the region of the left temple, and felt in no other place. Iron, quinine, arsenic, and a generous diet soon relieved the anæmia, and the localized headache and optic neuritis promptly disappeared.

Optic Neuritis from Lead Encephalopathy—The optic neuritis due to lead poisoning is associated with symptoms distinctive of lead in the system, such as the blue line on the gums, anæmia, abdominal colic, constipation, and the presence of lead in the urine.

Optic Neuritis from Chloral or Other Drug Habits that profoundly affect the neuro-vascular systems—Anæmia will be present in these cases, but it is rare for young females—those most subject to the anæmia which is a cause of optic neuritis—to be addicted to chloral abuse. In all cases of optic neuritis, if there is the least suspicion of a drug habit, the patient should be carefully watched.

The hyperæmia or even œdema of the optic disks, sometimes seen in association with uncorrected errors of refraction, is stationary, and never very pronounced. If one is on his guard, a mistake in diagnosis will not occur from this cause.

As optic neuritis, with more or less choking of the disks, occurs in about 80% or 90% of the cases of tumor of the brain, we have left from 10% to 20% of all cases in which this valuable aid in diagnosis is absent. The diagnosis is not always easy

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when optic neuritis is present, and in many of the cases in which it is absent, the difficulties are sometimes insurmountable. Persistent headache, obstinate vomiting, and pronounced vertigo, so common in certain organic diseases of the brain, especially when these are due to tumor, are rarely present without changes in the eye-grounds, except in tumors of the pons and medulla.

Edmunds and Lawford found, from an extensive analysis of the symptoms in intra-cranial tumor, that optic neuritis is most frequently absent when the growth is in the motor convolutions. I may add, from a large personal experience, that intra-ocular changes are infrequent in tumors of the centrum ovale of the motor convolutions and of the greater portion of the frontal lobe. When the lesion is in the motor convolutions, or in the sub-cortical region below these, monoplegia or hemiplegia, spasm and contracture may be present. The question then to decide is whether these symptoms are of organic origin, or due to hysteria. In cases of organic lesions attended by unilateral disturbance of motion, the deep reflexes are increased in the affected limbs to a far greater extent than occurs in hysteria. The reflexes may be increased on both sides of the body in hysteria and in hemiplegia or monoplegia of organic origin; but the marked difference between the deep reflexes of the affected and non-affected side observed in organic disease is not found in hysteria. The paralysis from organic disease, unless sudden in its onset and complete, begins in the distal portion of the limb, and is more marked than in the proximal portion. The paralysis of hysterical origin more commonly affects the entire limb alike. The sensory disturbance from a cortical or sub-cortical lesion is most marked for muscular and localization sensations, next for tactile, and least for temperature and pain sensations. This is not found so typical in hysteria. When the centrum ovale of the frontal lobe is involved, the mental disturbance is entirely different from that found in certain hysterical conditions. A careful analysis of the amnesia and impaired mentality of the patient will enable one in the vast majority of instances to determine whether organic

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trouble of some kind is present. Hemi-anæsthesia may be due to organic trouble or to perverted function. In regard to this, Gowers observes: "Hemi-anæsthesia, including the special senses, is one of the rarest effects of cerebral tumor, and is absolutely unknown from this cause unless associated with loss of motor power." The "crossed amblyopia" sometimes observed in hysterical subjects affected with hemi-anæsthesia, is entirely different from the homonymous hemianopsia caused by an organic lesion of the posterior portion of the internal capsule and adjacent parts. It is probable that persistent forms of sensory aphasia rarely, if ever, occur from hysteria, but temporary and variable aphasic conditions, both sensory and motor, may be due to hysterical conditions. So far, most of the cases of hysterical aphasia have been of the motor variety, partaking of the character of aphonia, rather than the distinct forms of motor aphasia.

In this connection I have said in another communication:

"There are very few cases of organic disease of the nervous system that do not present hysterical symptoms. In many, the organic nature of the trouble is so apparent and the symptoms of this are so obtrusive that we almost entirely overlook the hysterical aspect of the case, or term the symptoms partaking of this character, *nervousness*. The presence of a multitude of hysterical symptoms is of far less importance in establishing a diagnosis of hysteria than the existence of one symptom of organic origin is in pointing to a lesion of the latter nature. A good rule to follow in the study of difficult cases is, not to make a diagnosis of '*simple hysteria*,' no matter how numerous and prominent the symptoms of this may be, so long as even one symptom of organic disease can be found. In all cases of supposed hysteria we should not rest satisfied with such a diagnosis until repeated, thorough, and systematic examinations have failed to reveal the suspicion of organic trouble. In none of these cases should a diagnosis be accepted as final until sufficient time has elapsed to enable the physician to study the symptoms in all their details."

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IS THE MORBID PROCESS A TUMOR?

If, after due consideration has been given to all the smyptoms, their manner and order of development, and each has been studied in relation to the others present in the case, the conclusion is reached that organic disease of the brain is present, the next step in the inquiry is to determine the character of the lesion or, in this instance, is it tumor? The organic intra-cranial diseases may be separated into three groups—the vascular lesions, which are usually sudden in their onset; the acute inflammatory, which require a few days for the morbid process to reach its height; and the chronic, those that are gradual in their development.

It rarely occurs that we are likely to mistake a tumor of the brain for a vascular lesion, such as hemorrhage, thrombosis or embolism. We must remember, however, that a tumor of the brain may exist with ill defined symptoms for a time, and in the absence of a careful examination no grave lesion may be suspected until sudden œdema and softening involve the motor region, and the patient is seen by us for the first time paralyzed and unconscious, and presenting all the symptoms of the apoplectic state. If choked disks were present, a careful examination of the eyes with the ophthalmoscope, even in the absence of a history, might prevent a mistake in the diagnosis. But without a history, and in the absence of optic nerve changes in cases of brain tumor in which the terminal stage is by apoplexy, a diagnosis might be impossible. About two years ago I put on record a case of tumor of the brain in which the terminal symptoms closely simulated those of a vascular lesion. In that case a mistake in diagnosis was prevented by detecting a choked condition of both optic nerves.[1]

Of the acute inflammatory diseases, meningitis is probably the only one with which tumor of the brain is likely to be confounded. Uncomplicated cases of acute meningitis present symptoms not likely to be mistaken for those of tumor. It is in those cases of tubercular meningitis, in which tuberculous nodules have existed in the membranes prior to the development of the acute inflammation, that a mistake in diagnosis is

[1]Eskridge: Tumor of the Brain Simulating a Vascular Lesion. Medical News, March 10, 1894

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most likely to be made. The symptoms in such cases may partake of the character of meningitis and tumor. Every case must be studied with care, and the symptoms analyzed in the light of the previous history of the patient and the history of the development and progress of the disease. In those cases in which a tumor has existed prior to the development of the meningitis, not infrequently a history of attacks of apparently causeless vomiting, with headache, may be obtained.

Among the chronic diseases that may be mistaken for tumor of the brain, aneurysm, cerebritis, hydrocephalus, meningitis, paretic dementia, multiple and diffuse sclerosis, and abscess might be mentioned. Only the differential diagnosis between tumor and chronic abscess of the brain will be considered in this paper.

Chronic Abscess of the Brain—Since the last annual meeting of the society I have seen no reason to change the conclusions at which I arrived in my paper on the Diagnosis of Chronic Abscess, concerning the differential diagnosis between chronic abscess and tumor of the brain. They are: "The diagnosis between chronic abscess of the brain and tumor is sometimes very difficult or even impossible. Prof. Von Bergmann, and many others, lay great stress upon etiological considerations and the presence of fever, in favor of abscess. But, as we have already seen, the history of middle-ear disease, which Bergmann considers the principal cause of abscess, does not preclude the possibility of tumor. Hitz saw a man who for sixteen years had suffered from otorrhœa, and besides had received a blow on the head, yet he died of tumor of the brain. The case of the little girl, 11 years of age, reported in this paper, illustrates the fallacy of laying too much stress upon etiology. She had suffered from otorrhœa, had had an abscess in the right groin, and had received a severe blow to the head—all possible causes of abscess—yet she died from tumor and cyst of the cerebellum. Instead of the presence of fever being a symptom of chronic abscess, a sub-normal temperature extending over a considerable period is more commonly the rule. There may be periods of febrile processes in abscess, but we also find the same condition in tumor. Neither tumor

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nor chronic abscess free from complications, such as meningitis and distention of the lateral ventricles, are, as a rule, attended by fever. If the temperature record is any aid in the differential diagnosis between these two morbid processes, it is that a prolonged sub-normal temperature, in a case of organic brain disease, associated with evidences of great prostration, such as loss of flesh, strength, appetite, and at times, a yellowish, pale hue of the skin, is in favor of abscess rather than tumor. We must remember that while traumatism to the head is a frequent cause of abscess of the brain, it is also capable of giving rise to tumor. In cases of old injuries to the head, dating back more than a year, in which no evidence of inflammation of the brain immediately followed the trauma, if there is development of organic disease of the brain, supposing the diagnosis to lie between abscess and tumor, the probabilities, other things being equal, will be in favor of the latter. Well pronounced swelling of the optic disks, amounting to 1-30 or 1-20 of an inch (requiring + 3 D or + 4 D to see the center of the disk), is always against abscess and in favor of tumor. It is conceivable that an extreme degree of choked disk might occur from abscess; but I have never observed it, and I am not aware that it has been met with by others. Complete blindness is not an infrequent result of tumor, and well advanced amaurosis is very common. In abscess, I have never met with marked amaurosis, and my personal experience in this direction is but confirming the observations of Gowers, Murri, and others. Optic neuritis, limited to the same side of the brain as the abscess, is said to have occurred. It must be exceedingly rare, and as the same eye phenomenon has been observed in tumor, it has no practical diagnostic value. In a case of distension of the right lateral ventricle, from accumulation of a straw-colored watery fluid, observed by me some years ago, well pronounced optic neuritis was found on the right side, while on the left the eye was normal. Hirt calls attention to the diagnostic value of paralysis of groups of muscles consecutively involved in abscess. This undoubtedly is of frequent occurrence in this disease; but, as paralytic symptoms are found in only about one-half the cases of abscess of the brain, and as the muscular involvement from tumor of the brain sometimes takes place by

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groups, the phenomenon loses much of its supposed significance in a differential diagnosis. A steady but gradual increase of symptoms of organic disease of the brain, with the development of one nerve-root symptom after another, is in favor of tumor; so are prolonged periods during which the symptoms make but little progress."

THE LOCATION OF THE TUMOR.

Having arrived at the conclusion that a tumor is present, the next procedure is to endeavor to locate it. If the growth is in the motor area, or in other portions of the brain the functions of which have been fairly well determined, it may be located in the majority of instances. On the other hand, if one of the "latent" regions of the brain is the seat of the tumor all efforts at localization may be unsuccessful. We should always bear in mind the possibility of multiple tumors.

It will be impossible for me to give in this paper more than a few suggestions in regard to the localization of tumors in the various regions of the brain.

Tumors in the Premotor Region—The general symptoms of a growth in the brain may be absent, and when present are often much less pronounced than when the lesion occurs elsewhere. If the tumor affects the convolutions, optic neuritis will likely be present, but if it is limited to the centrum ovale, it will be more frequently absent than present. The disturbances of the mental integrity are usually the most marked and most reliable for localizing purposes. The patient is unable to concentrate his mind on any subject long at a time; judgment is weakened, and loss of mental control is marked, so that the sufferer is emotional, easily moved to tears, anger, or laughter. These symptoms are intensified if bilateral lesions occur. So far as the mental symptoms are concerned, they are the same, regardless of the side of the brain that is affected. Sometimes, when it is quite evident that there is a lesion in one frontal lobe, it is almost impossible to determine on which side of the brain it is situated. Not infrequently percussion tenderness aids in locating the tumor in one frontal lobe. The headache is not infrequently, especially in the early history of the tumor, complained of on the opposite side of the head to that on which the growth is situated. When the neoplasm extends

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posteriorly and affects the speech center on the left side, or the motor region on either side, the additional symptoms caused by such extension of the tumor are sufficient to enable one to locate the lesion with definiteness. I have never met with a case of tumor of the frontal lobes in which ataxia of the cerebellar type has been present.

Tumors of the Motor Region—Disturbances of motility, usually at first of the monoplegic type, and beginning in the distal portion of the limb, are the most common and reliable localizing symptoms. When the cortex is the seat of the tumor, Jacksonian epilepsy will frequently precede the paralysis; but if the growth starts in the centrum ovale and extends towards the cortex, paralysis will likely precede the convulsions. Sensory symptoms most marked for muscular and localization sensations are common when the motor cortex is the seat of the tumor. A careful study of the manner of the development of the symptoms, with the order in which the groups of muscles are affected, either by spasm or paralysis, will usually enable one to make an accurate localizing diagnosis. Orolingual paralysis, with special defect in speech utterance, and motor aphasia, will be present when the tumor affects the lower face center on the left side in right handed persons, or on the right side in left handed individuals. From a detailed study of one case of cyst of the foot of the second frontal convolution, an elaborate account of which is in the hands of the publisher, and from my notes of another case now under my care, in which the lesion is supposed to involve the second frontal convolution, it is probable that a tumor or other lesion in this situation will give rise to inability to spell—a loss of the memory for the arrangement of letters in the formation of words—and in consequence an inability to write intelligently, although all the letters are formed perfectly.

Tumors of the Parietal Lobe—If the tumor is small, no localizing symptoms may be present, except by extending forward it affects the motor convolutions, or backward and involves the angular region. If it does the latter on the left side in right handed persons, or on the opposite side in left handed individuals, visual disturbances of speech will be present; and on either side, if the tumor extends deep enough to involve the

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optic radiations of Gratiolet, bilateral homonymous hemianopsia will be present. The inferior parietal lobule seems to be intimately connected with muscular sense on the opposite side of the body.

Tumors of the Temporo-Sphenoidal Lobe—About the only reliable localizing symptom caused by a tumor in this portion of the brain is some form of auditory disturbance of speech, such as word-deafness or mind-deafness, resulting from a lesion in the posterior portions of the first and second temporal convolutions on the left side. Affections of taste and smell, supposed to occur from a lesion in the anterior median aspect of the temporo-sphenoidal lobe, are too uncertain to be worthy of much credence until further clinico-pathological observations give them a more definite localizing value.

Tumors of the Occipital Lobe—If the cuneus or optic radiations are affected, bilateral homonymous hemianopsia, the blind half-fields on the side opposite to the growth, will be found; otherwise no symptoms of any localizing value will be present.

Tumors of the Cerebellum—Optic neuritis, vomiting, and headache usually occur and are well pronounced. Localizing symptoms may be present or entirely absent, depending upon the seat of the tumor and the adjacent structures invaded by it. If the growth is small and limited to the lateral lobes of the cerebellum, no symptoms of a localizing nature of any special value may be detected. The drunken man's gait (cerebellar titubation) and a tendency to forced movements in certain directions, with pronounced optic neuritis, headache, vomiting and late oculo-motor disturbances are in favor of tumor of the cerebellum. On the other hand, if the oculo-motor disturbances appear early and are followed by those symptoms that indicate cerebellar lesion, the tumor has probably originated in the region of the corpora quadrigemina and extended backward towards the pons and medulla. With symptoms simulating those of a cerebellar lesion, minus any evidence of cranial nerve involvement, but instead the presence of a unilateral or bilateral weakness and more or less muscular rigidity, the tumor is probably in the corpus callosum.

Tumors of the great ganglia at the base are attended by no definite symptoms, unless the fibres of the internal capsule

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are involved. The localizing symptoms in cases of tumors of the centrum ovale depend upon the affection of the motor or sensory fibres of the projectile system. The nearer the tumor is situated to the cortex of the motor region, the more nearly will the symptoms simulate a cortical lesion with monoplegia, etc. On the other hand, if the tumor is near the great ganglia, hemiplegia will likely result.

CHARACTER OF THE GROWTH.

If we have succeeded in localizing the tumor, it is desirable, if possible, to determine its nature. In many cases our efforts in this direction often amount to little more than a shrewd guess, and I shall not encroach upon the time of the society in attempting to discuss the subject at this time.

IS THE TUMOR OPERABLE, AND WHEN SHOULD SURGICAL MEASURES BE ADVISED?

One of the diagnostic problems which the neurologist is expected to solve relates to the propriety of surgical treatment. From a careful study of numerous cases, he should not only be able to diagnosticate and locate the growth, but he should be in a position to counsel intelligently concerning the advisability of adopting surgical measures, either for the removal of the tumor or for the relief of pain. Not all portions of the brain are accessible to the surgeon's knife. A growth situated in the cortex or in the white substance immediately below it anywhere over the superior and lateral aspects of the brain and in portions of the anterior and middle fossæ, can be readily reached and removed by a skillful operator. It is probable that a growth of medium size can be removed with safety to the patient from any of these regions, with the possible exception of the cerebellum, and I should not feel inclined to exclude the latter portion of the brain from the field of operation were it possible to locate definitely a growth in the lateral hemispheres of the cerebellum.

IF A GROWTH IS OPERABLE FROM ITS SITUATION, HOW LONG SHOULD SURGICAL MEASURES BE POSTPONED?

If an intra-cranial tumor does not yield materially to vigorous internal medication within six weeks to two months, it

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is exhausting to the patient and a loss of valuable time, much to the detriment of his chances of recovery, to pursue such a line of treatment longer. If, after marked improvement from anti-syphilitic agents, the growth should show signs of activity while such a course of treatment is being kept up, the probabilities are that the lesion is not syphilitic, and radical measures should be adopted at once, provided there are no contra-indications for such procedures. It would be folly to attempt to remove a carcinoma or a melanotic sarcoma from the most accessible regions of the brain. Encapsulated sarcomata, cysts,[1] and small fibromata afford the best prospects of relief by the knife. In a few cases, the most discouraging cases give the best prognosis after an operation. One of the most brilliant results that it has been my good fortune to witness from brain surgery, followed the removal, by Dr. Clayton Parkhill, of a large infiltrating glioma from the left parietal and Rolandic regions of the brain in the person of a physician conjointly attended by us. If a tumor is operable, the earlier surgical measures for its removal are adopted, the better are the chances for the relief of the patient.

DISCUSSION.

Dr. H. T. Pershing—In the diagnosis of tumor of the brain, it seems to me that our main guide is the presence or absence of optic neuritis. I never feel absolutely sure of the diagnosis of tumor unless optic neuritis is present. Nevertheless, it is well known that some cases do run their course without optic neuritis making its appearance. I had a very instructive case of that kind a couple of years ago. A middle aged gentleman coming from an adjoining state consulted me on account of epileptic attacks, which had lasted for about two years. There was no serious headache and no vomiting. The right upper quarter of each visual field was absolutely blind. The eye grounds were examined repeatedly, and at no time was even congestion of the disk present. The last time the examination was made was within two or three days of the patient's death. For a time he improved on anti-syphilitic treatment, but afterwards grew worse. In the latter part of the disease the sen-

[1] It is probable that the cyst wall should be removed, because when this is left behind a recurrence of the trouble is likely to take place.

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sory aphasia became marked. A few days before his death the headache became quite marked. I had made a diagnosis of softening from vascular occlusion, but at the autopsy a very large tumor was found in two parts: one-half was mainly in the left temporal lobe, nearly filling the white matter of that lobe, which accounted for the sensory aphasia; another part was in the region of the corpora quadrigemina; this accounted for the defect in the visual fields. The cortex of the occipital lobe, which I thought would be affected, was all right. In that case I do not think it was possible to make the diagnosis of tumor before death—certainly not until within a few days of death. Had there been headache and vomiting along with the onset of the disease, then the presence of tumor would have seemed more probable.

It was very forcibly brought out in the paper that the presence of optic neuritis is not necessarily due to tumor. In by far the greater number of cases in which optic neuritis is found, it is due to tumor, but the exceptions are extremely important. I saw a young lady about two years ago, who for a few weeks had been complaining of severe headache, vomiting, and failure of vision. On making an ophthalmoscopic examination, I found a double optic neuritis; it was not the optic neuritis we generally find in Bright's disease, but it appeared, as far as I could tell, exactly like the optic neuritis we find in a tumor. The urine was examined, and it was found to be of normal specific gravity, of normal appearance—no albumen, no sugar, and no tube casts. But the patient's face was puffy, full, and pale, and there was œdema of the legs and feet. I got the history of this case, and it was very well cleared up. The patient had been examined a few weeks before by Dr. Eleanor Lawney, and at that time there was an abundance of albumen in the urine, many tube casts, and some blood. In that case, without the knowledge that Dr. Lawney was able to give me, the uræmic symptoms might have been overlooked and a diagnosis of tumor made. The patient made a good recovery, mainly under Basham's mixture.

The presence of hysteria, along with symptoms of tumor, was well illustrated in a case that I saw some time ago with Dr. Mager and Dr. Parkhill, in which Dr. Parkhill operated, and removed a glioma.

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In regard to the differential diagnosis between tumor and abscess, I should be disposed to rely on irregularity of temperature as a sign of abscess rather than on either its elevation or depression. It may be irregularly elevated or irregularly depressed; whereas, in tumor, the temperature is comparatively regular, and is generally normal. A latent abscess, however, may not affect the temperature at all.

The cerebellum is about the worst seat of location of tumor for operation that I know of, unless it should be at the base further forward. Hereafter I shall not recommend a removal of tumor from the cerebellum. Dr. Munn, Dr. A. K. Worthington, and myself had a case that seemed unusually favorable for operation on the cerebellum. We had to wait in order to determine which side the tumor was on. The staggering was mainly to the left, but we did not feel that this was sufficient indication that the tumor was on the right side. However, one of the ocular nerves on the right side became paralyzed, and then the operation was undertaken. Dr. Munn trephined directly over the site of the tumor, which was in the right lateral lobe close to the median line. The tumor was a glioma; it was completely removed by Dr. Munn, and no tissue was unnecessarily removed, as the autopsy disclosed; but the patient, although he seemed to have improved for twenty-four hours, died about thirty-six hours after the operation. Hereafter I shall follow the example of Horsley, in a case called to my attention by Dr. Munn, and instead of recommending removal of a cerebellar tumor, I shall recommend the removal of a sufficient amount of the occipital bone to relieve pressure, and be content with that instead of a radical operation. The cases of tumor of the cerebellum have been a failure so far; at least they were up to a short time ago, and if there are any exceptional cases I have not heard of them.

Dr. Eskridge—I would like to say in regard to the differential diagnosis between tumor and abscess of the brain, that the point discussed in this paper was limited to tumor and chronic abscess. In this form of brain suppuration there is none of the irregularity of temperature of which Dr. Pershing speaks, until the terminal period is reached.

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THE DIAGNOSIS OF HEADACHES.

HOWELL T. PERSHING, M. D., DENVER, COLO.

It is my aim in this paper to make a sketch map of that part of the pathological field in which headaches are of especial importance, but not to discuss the finer points of differential diagnosis. In submitting the sketch I have made, I must ask for some leniency on account of the many possibilities of omission and serious error. The division of the various forms of headache into groups has been determined solely by considerations of practical convenience in every-day diagnosis. Neuralgia of the face or head is not regarded as headache.

In any serious case of headache the first question to be answered is, whether it is due to organic disease of the brain or its membranes. If the pain is unusually persistent or severe, the possibility of organic disease should always be borne in mind and a careful search should be made for some of its positive signs, such as paralysis of the ocular muscles, the face, the tongue, or one side of the larynx; inequality of the pupils or their failure to react to light; optic neuritis or optic atrophy; typical ankle clonus; Jacksonian epilepsy; etc. In case organic disease exists, the diagnosis is between meningeal hemorrhage, acute meningitis, alcoholic or syphilitic chronic meningitis, abscess, and tumor. The causes of these diseases should be sought for and the presence or absence of the usual cause of a disease should be given due weight.

If organic disease of the brain or membranes can be safely excluded, we have next to consider whether disease of the blood vessels is the cause. Arterio-sclerosis in elderly patients, and syphilitic endarteritis in younger ones are prolific sources of headaches.

Among the headaches not due to organic disease of the brain, membranes, or vessels, migraine stands apart as a distinct disease, and is to be recognized by its periodicity, the unilateral distribution of pain, concomitant nausea, and peculiar visual symptoms.

The headaches accompanying the various infectious fevers usually appear at the onset of the fever and disappear when

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delirium or sopor supervenes, while the headache of organic disease persists as long as the patient can be aroused. This difference is a valuable guide when meningitis is suspected in the course of an infectious fever, but the main reliance must be on the presence or absence of positive signs of organic disease.

There are many morbid conditions in which a toxic substance circulating in the blood causes headache. The most important of these are diabetes, uraemia, gout, alcoholism, lead poisoning, and various forms of perverted digestion.

Should the case in hand give no indications of a toxic cause, derangements of the cerebral circulation should be considered. These are active hyperæmia, passive hyperæmia, and anæmia, each of which is easily recognized if the possibility of its occurrence is borne in mind.

Infective, toxic, and circulatory causes having been excluded, a reflex cause must be looked for—and by far the most important of these is eye strain, due usually to an error of refraction, but occasionally to weakness of one or more of the extra-ocular muscles. Sometimes headache is due to disease of the nose or of its adjacent sinuses, and increases or diminishes with this disease. In some of these cases the headache may be markedly increased by touching the middle turbinated bone with a probe, and alleviated by the application of cocaine to the nasal passages.

We come finally to those headaches to which no organic, toxic, circulatory, or reflex cause can be assigned, and here we have to consider two great types of disease whose importance is not easily over-estimated—neurasthenia and hysteria. These diseases have much in common, and both may co-exist in the same patient. In the severe cases the presence or absence of the well-known stigmata of hysteria is the most valuable means of distinguishing the two diseases. In the milder cases all symptoms that can be attributed to emotional instability or suggestion are to be considered as hysterical, while those that are due to exhausting influences without any appreciable effect of suggestion are neurasthenic.

Following the principles just outlined, I have analyzed the symptoms of the diseases in which headache is likely to be a prominent feature, and have arranged them in a table so that

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by comparing the symptoms of an individual case with the headings and sub-headings of the table, the probable diagnosis can be quickly found. In form this table has been modeled after those by means of which botanists, zoölogists, and mineralogists find the name of an unfamiliar specimen. It is of course understood that in a difficult case no one ought to rely upon such a table alone; but I am sure that it will be found useful as a preliminary outline of the field and a guide to those parts demanding more minute study.

Headache—Pain in the head not limited to the distribution of particular nerves.

1. There is organic disease of the brain or its membranes, shown not merely by the severity and persistence of the headache, but also by the occurrence of some more positive sign—e. g., paralysis of ocular muscles, face, tongue, or one side of larynx; inequality of pupils or failure of light reaction; optic neuritis or optic atrophy; typical ankle clonus; Jacksonian epilepsy, etc. If delirium or stupor occurs, the headache still continues. Vomiting common.

a. Onset sudden or very rapid, in a few minutes to a day, following an injury, or occurring in an aged or insane person. Convulsions without fever or other evidence of infection, followed by paralysis on the side opposite the headache. Sopor and coma, with slowness of pulse supervene. Meningeal hemorrhage.

b. Onset gradual but acute, in a few hours to a few days, with fever. A source of intra-cranial infection or irritation present—e. g., otitis media, tuberculosis, pneumonia, epidemic influence, wound of head, insolation, etc. Whole course short—a few days to a few weeks. General hyperæsthesia common in early stage. Spasm of neck, general convulsions and cranial nerve symptoms, such as ptosis, strabismus, inequality or immobility of pupils, paralysis or twitching of face, etc., common. Optic neuritis occasional; rarely intense. Temperature irregular; may at times be depressed. Meningitis.

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c. Onset rapid or slow. Source of purulent infection. Temperature irregular. There may be rigors followed by fever and sweating. Periods of latency may occur. Abscess.

d. Onset slow. Optic neuritis. Temperature usually normal. No signs of suppuration. Tumor.

e. Onset slow, without fever and without intense optic neuritis or slow pulse. Patient alcoholic or syphilitic. Organic disease indicated by spasm or paralysis in the domain of cranial nerves; rarely in limbs. Chronic meningitis.

2. Positive signs of organic disease of the brain or membranes absent, but there is evidence that the blood vessels are diseased.

a. The patient is past 40. The arteries are atheromatous and pulse hard. Headache is throbbing, and is increased by exertion or excitement. Heart often hypertrophied and some albumen is usually found in the urine. Arterio-sclerosis.

b. Age generally less than 40. Headache chiefly nocturnal and accompanied by insomnia. History or physical condition gives evidence of syphilis. Syphilitic endarteritis.

3. No organic disease of brain, membranes, or vessels.

a. Headaches periodic, with intervals of complete freedom. Pain usually unilateral, at least at first, and accompanied by nausea and intolerance of light and noise; often by partial darkening of the field of vision or flashes of light. Family history of similar attacks or of epilepsy or other neuroses common. Migraine.

b. No distinct periodicity. Pain not unilateral.

§ Headache appears at the same time as fever and disappears if delirium supervenes. Meningitis may be closely simulated, but there is evidence of general infection (usually specific) without any unequivocal sign of organic disease of the brain or its membranes. Infectious fever.

§§ There is no infection, but there is evidence that a toxic substance is active in the system.

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* The urine contains sugar. Patient suffers from polyuria, thirst, weakness, etc. Diabetes.

** The urine contains albumen, or casts, or both. Pallor and œdema often manifest. There may be a characteristic retinitis or optic neuritis. Uræmia.

*** Urine free from albumen and sugar, but at times is dark and deposits urates. Headache worse in early morning, and tends to wear off during the day. Uric acid diathesis indicated by attacks of rheumatism, gouty inflammation, tonsilitis, gravel, etc., or by gouty deposits. Gout.

**** History of excessive consumption of alcohol, perhaps of delirium tremens. There may be irritative dyspepsia, morning vomiting, characteristic odor of breath, insomnia, tremor, etc. Alcoholism.

***** Digestion is perverted, as shown by abdominal distress, eructations, flatulence or other symptoms. Headache is usually dull, comes on soon after eating or is associated with the eating of some particular food, and is temporarily relieved by purgatives and antiseptics. Indigestion.

****** Patient has been exposed to lead, which may perhaps be found in the urine. There may be a blue line on the gums, colic, with constipation, or bilateral wrist drop. Plumbism.

§§§ No infective or toxic cause, but the circulation of the brain is disturbed.

* Headache throbbing, follows excitement or exertion, and may be associated with a flushed face or injection of the conjunctivæ. Increased by coughing, sneezing, straining, or lowering head. Active hyperæmia.

** Headache dull and heavy. Return of venous blood obstructed by mitral regurgitation, tumor of the neck, constriction, or other cause. Passive hyperæmia.

*** Heart action weak or blood impoverished, as shown by pallor of skin and mucous membranes, paucity of red blood corpuscles, faintness, etc. Anæmia.

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§§§§ No infective, toxic or circulatory cause, but there is a reflex disturbance.

* Pain especially associated with the use of the eyes for near work, and is felt in the brow or back of the eyes, or appears to extend from the eyes to the back of the neck. An error of refraction is present, or more rarely a weakness of one or more of the extra-ocular muscles. Eye strain.

** Pain associated with disease of the nose or its adjacent sinuses and increases or diminishes with it. Inner wall of orbit may be tender, or headache may be markedly increased by touching the middle turbinated bone with a probe.
Nasal headache.

§§§§§ No organic, toxic, reflex, or circulatory cause apparent.

* Nerve force exhausted from any cause. Sensations in head may be disagreeable rather than painful, and are often described as queer, such as tightness or looseness of the scalp, lightness or heaviness of the head, etc. Spinal tenderness and morbid fears common. Neurasthenia.

** Headache appears and disappears in accord with emotional changes or in response to suggestion, often limited to a small spot at vertex (clavus). Various signs of hysteria may be present. Hysteria.

DISCUSSION.

Dr. J. T. Eskridge—In regard to the diagnosis of headache, there is scarcely anything so difficult as to determine the cause in many obscure cases. Personally, in investigating these cases, my first attempt is to exclude the presence of any organic disease, and this usually can be done in the majority of instances. Having excluded these and the migrainous headaches, we can set down from one-third to one-half of the remainder as being due to gastric and intestinal disturbances, and the remainder to reflex causes and specific poisons circulating in the blood. In studying the causes of headache, the eyes, nose, organs of generation, digestive tract, and all other causes must be taken into consideration.

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Dr. Pershing—This is intended as a mere outline to serve as a guide to that point where special study will be most profitable. I had some doubt at first whether to class the headaches of indigestion as due to reflex disorders or as due to toxic influences; but I believe that these headaches are in a great majority of cases due to the absorbtion of toxic products of perverted digestion, and that they are not reflex. The only headaches that I feel sure of being reflex are those of eye strain and nasal disease. As to headaches due to uterine reflexes, I very much doubt whether they exist at all.

THE DIAGNOSIS AND PROGNOSIS OF SPONDYLITIS.

JOHN RIDLON, M. D., CHICAGO, ILL.

The diagnosis of spondylitis, or Pott's disease of the spine, is at times no easy task; especially is this so in the early stage, before the development of a bony deformity.

For greater convenience in considering the subject of diagnosis, the spine may be divided into three regions—the cervical, the dorsal, and the lumbar.

First, cervical region: The only condition from which we are likely to be called to differentiate is torticollis. In torticollis there is a bending or twisting of the neck, due to a tonic spasm or a structural shortening of one, or at most a few muscles; usually only the sterno-mastoid muscle is involved. This condition of affairs restricts the movements of the head only in such directions as put the affected muscle or muscles on the stretch; all other movements are free and normal. In cervical spondylitis, however, the movements are restricted in all directions; and this restriction to motion in all directions is the characteristic symptom of cervical spondylitis. At times the diagnosis may be differentiated by the relation of the chin to the prominent sterno-mastoid muscle. In torticollis the chin points away from the contracted and prominent sterno-mastoid muscle; in cervical spondylitis it often points toward the more prominent sterno-mastoid muscle. In early cases, before any

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distortion appears, obscure but persistent pains in the shoulders or running up the back of the head are worthy of careful investigation, and the diagnosis must depend upon the restricted motion in all directions.

Second, dorsal spondylitis: In early cases the only symptom may be persistent distant pain. Pain in the chest, stomach or abdomen, which is not relieved by the usual medication, should always be regarded as sufficient grounds for watchful care of the spine. When an angular kyphosis has appeared, the diagnosis may generally be considered as certain; but when the kyphosis is a curvature and not an angle, we must take stoop-shoulders into consideration in the upper region, and the rachitic spine into consideration in the lower region; and when the deformity is a lateral one, scoliosis must be carefully considered.

Little need be said on the subject of stoop-shoulders; there is little rigidity in these cases in children.

In the rachitic spine the deformity forms a rounded curve, usually occupying the lumbar and lower half of the dorsal region. It may be quite stiff, and there may be some evidences of sensitiveness on manipulation. Rachitic curvatures, in so far as I know, only are found in very young children, and the children often present other rachitic manifestations.

In differentiating between dorsal spondylitis and scoliosis, the duration of the deformity must be considered in relation to the rigidity of the curvature. Dorsal spondylitis often presents a lateral bending of the column before a posterior curvature or angle appears; such a curvature is a relatively rigid one, even from its inception, while the deformity of scoliosis does not become rigid to any marked extent until several years have elapsed, and the deformity has become quite pronounced. Upon this point, then, the differentiation depends. A slight but rigid curve is likely to be spondylitis; a slight but flexible curve is surely scoliosis.

The hyperæsthetic or irritable spine should be mentioned. It presents, as a rule, no deformity, although there may be a long, sweeping posterior or lateral curvature occupying the whole dorsal and lumbar regions. The spine is often held

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rigid, and always presents tender points to gentle pressure along the line of the spinous processes. Tenderness to pressure along the spinous processes is not found in spondylitis unless there be a local abscess or caries of a spinous or transverse process, which is so rare an occurrence that I have not met with it.

The diagnostic test of dorsal spondylitis is restriction of motion in all directions. At the same time it must be remembered that the dorsal spine has much less normal mobility than the lumbar or the cervical regions. In dorsal spondylitis there is often a sense of weakness, and this is exhibited by an inclination to lean the arms on something for support, and in a disinclination to bend forward to pick up an object from the floor and rise again in the usual manner.

Third, lumbar spondylitis: Disease in this region is usually first indicated by awkward or unusual attitude or carriage, or by a limp. At times there is pain down the anterior and inner side of the thighs. Hip disease and sacro-iliac disease must be considered in this connection.

Sacro-iliac disease rarely, if ever, affects young children without the lower lumbar vertebræ being also involved. It is more often than otherwise found in young adults, and often presents a traumatic history. The diagnosis is often difficult at a single examination, but the differentiation must depend upon the rigidity. In lumbar spondylitis the spine is rigid to bending in all directions. In sacro-iliac disease careful handling will often show a lumbar spine which bends forward with normal freedom.

The differentiation of hip disease more frequently demands our skill; it depends solely upon the question of rigidity to motion in all directions. In hip disease all the movements at the hip joint are restricted to some considerable extent, while the lumbar spine may be bent normally, at least in some directions; in lumbar spondylitis the movements at the hip are free in flexion, and in rotation when the thigh is partly flexed. The lumbar spine, however, is held rigid to bending in all directions.

The differentiation between spondylitis and scoliosis is the same in the lumbar as in the dorsal region.

Malignant disease of the spine is rare in any region; it

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more frequently is found in patients of advanced years than in children; it is characterized by more intense gnawing pain than in spondylitis, and it grows progressively worse, despite any form of treatment. The pain of spondylitis is usually relieved by immobilization of the part and by recumbency.

The prognosis of spondylitis is much better than is generally believed. The percentage of deaths is not more than from 8% to 12%. Cases treated by sufficiently prolonged recumbency can be cured without any increase in the kyphosis. Cervical disease, unless the kyphosis is of very long standing can be cured without deformity, and as a rule a very considerable degree of normal mobility can be restored. In lumbar and dorso-lumbar disease a very considerable reduction of the deformity can be had from prolonged recumbency. In upper dorsal disease the deformity is likely to increase under any form of brace treatment which permits of locomotion; in these cases prolonged recumbency is essential. In all cases except the upper dorsal region, a carefully adjusted brace may be expected, in the vast majority of cases, to prevent an increase of the posterior deformity; but brace treatment without recumbency cannot be expected to diminish the kyphosis. The prognosis as to time cannot be set down. No case should be under treatment and observation for less than three years, and in many cases twice that length of time will be consumed before a cure can be safely prognosticated.

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LIST OF MEMBERS.

Date.		
1894	Ambrook, Mary L.	Boulder
1896	Ames, Fred N. S.	Denver
1873	Anderson, B. P.	Colorado Springs
1886	Arbogast, B. A.	Breckenridge
1896	Ashley, Wm. W.	Ouray
1887	Auerbach, L.	Denver
1892	Axtell, E. R.	Denver
1892	Ashbaugh, A.	Central City
1892	Baker, Madeline Marquette	Denver
1894	Bagot, W. S.	Denver
1892	Bane, W. C.	Denver
1892	Bates, Mary E.	Denver
1892	Bates, Mary H. Barker	Denver
1895	Beatty, J. T.	Highlands
1895	Bedell, W.	Lamar
1895	Beebee, J. E.	Denver
1892	Bellrose, Norman W.	Eaton
1878	Beshoar, M.	Trinidad
1894	Black, J. A.	Pueblo
1892	Black, G. Melville	Denver
1895	Blaine, J. M.	Denver
1879	Blickensderfer, J. C.	Denver
1888	Boice, Jno.	Denver
1884	Bonesteel, S. A.	Denver
1896	Bonesteel, Arthur E.	Central City
1888	Bonnet, W. M.	Denver
1892	Bonney, S. G.	Denver
1894	Boyd, E. T.	Leadville

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Date.		
1895	Brasher, Lewis B	Denver
1895	Brown, Elizabeth E	Denver
1895	Bruner, Wm. L	Meeker
1895	Buchtel, W. H	Denver
1883	Bucknum, A. M	Denver
1889	Bucknum, H. H	Denver
1894	Bulette, W. W	Pueblo
1896	Bull, F. B	Denver
1894	Bull, H. R	Grand Junction
1896	Burley, Geo. W	Boulder
1894	Burns, T. M	Denver
1896	Burns, Horace R	Leadville
1895	Calhoun, A. W	Denver
1892	Campbell, W. A	Colorado Springs
1883	Carlin, P. V	Denver
1895	Carlin, T. J	Denver
1895	Carrier, F. N	Canon City
1892	Case, A. G	Denver
1895	Cheney, Alex. M	Denver
1894	Chipman, J. C	Sterling
1883	Clark, J. K	Denver
1889	Clark, J. L	Denver
1884	Cleary, Geo	Denver
1889	Clough, A. A	Denver
1894	Cochems, F. N	Salida
1893	Coleman, A. W	Denver
1895	Collier, F. M	Denver
1894	Conroy, C. P	Denver
1890	Coover, D. H	Denver
1882	Corwin, R. W	Pueblo
1883	Craig, W. B	Denver
1896	Craig, A. L	Denver
1878	Craven, T. H	Canon City
1892	Crouch, H. C	Denver
1888	Croker, F. B	Littleton
1895	Cummings, W. M	Las Animas
1892	Davidson, Jno	Central City
1894	Davis, W. B	Pueblo

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Date.		
1892	Davis, W. C	Denver
1895	Davis, W. H	Denver
1894	Davison, Jno. T	Denver
1878	Dawson, J. W	Canon City
1894	Dean, M. H	Glenwood Springs
1892	Debeque, W. A. E	Debeque
1874	Denison, Chas	Denver
1895	Delehanty, Edw	Denver
1895	Disney, F. A. E	Denver
1887	Dorland, W. L	Pueblo
1894	Durbin, L. T	Denver
1871	Edmundson, W	Denver
1891	Elliott, Jno. F	Idaho Springs
1895	Ellis, Lyman M	Denver
1871	Elsner, Jno	Denver
1885	Eskridge, J. T	Denver
1890	Exline, J. W	Denver
1894	Ferguson, C. J	Denver
1895	Fierstone, J. L	Fort Morgan
1888	Finney, Frank	La Junta
1894	Fish, E. H	Denver
1882	Fisk, S. A	Denver
1891	Fleming, C. K	Denver
1885	Forhan, T. J	Rouse
1891	Foster, Jno. M	Denver
1894	Freeman, W. L	Denver
1895	Freeman, Leonard	Denver
1896	Freeman, Russell B	Denver
1885	Galloway, B. S	Leadville
1888	Gardiner, C. F	Colorado Springs
1894	Gilbert, Bartlett	Denver
1893	Gildea, P. F	Colorado Springs
1895	Gilmore, R. T	Denver
1896	Gould, John	Grand Junction
1879	Graham, J. W	Denver
1885	Graham, R. F	Greeley
1890	Grant, W. W	Denver
1893	Green, Frank D	Pueblo

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Date.		
1880	Greene, J. L.	Minturn
1896	Griffith, Benj. F.	Leadville
1884	Hall, J. N.	Denver
1896	Hamilton, Geo.	La Jara
1888	Harrison, M.	Aspen
1889	Hart, James A.	Colorado Springs
1894	Harvey, H. G.	Denver
1892	Haskins, B. F.	La Junta
1885	Hassenplug, G. K.	Denver
1879	Hawes, Jesse	Greeley
1880	Hawkins, T. H.	Denver
1892	Hawk, J. W.	Denver
1888	Hay, Rilla G.	Pueblo
1896	Hazlett, H. F.	Pueblo
1895	Heath, Lillian	Rawlins, Wyo.
1891	Herrick, J. C.	Denver
1893	Hershey, E. P.	Denver
1894	Hickey, C. G.	Denver
1893	Higgins, J. W.	Denver
1895	Hill, E. C.	Denver
1894	Hobhouse, Edmund	Glenwood Springs
1892	Holmes, A. M.	Denver
1894	Hopkins, S. D.	Denver
1875	Horn, T. G.	Colorado Springs
1894	Howard, E.	Denver
1884	Howland, H. H.	Denver
1894	Huffman, O. C.	Denver
1886	Hughes, T. A.	Denver
1894	Hunter, Chas.	Colorado Springs
1892	Hutchinson, J. Cooper	Florissant
1896	Jacobs, S. Wesley	Denver
1895	Jaeger, Chas.	Denver
1884	Jayne, W. A.	Denver
1896	Jeannotte, J. A.	Leadville
1895	Jefferson, B. L.	Littleton
1895	Jeffery, Alicia F.	Denver
1894	Johnson, Abijah	Montrose
1894	Johnson, Carl	Denver

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Date.		
1895	Johnson, J. E	Denver
1895	Kahn, Lee	Leadville
1891	Kahn, Sol. J	Leadville
1896	Kearby, E. W	Rocky Ford
1884	Kelley, J. P	Golden
1896	Kemble, L. H	Aspen
1893	Keith, John G	Leadville
1896	Kickland, W. A	Fort Collins
1890	King, A. T	Pueblo
1892	Kleiner, M	Denver
1891	Law, G	Greeley
1896	Law, John	Leadville
1895	Lake, E. F	Denver
1889	Leavitt, B. C	Denver
1882	Lee, E. A	Fort Collins
1874	Lemen, H. A	Denver
1873	Lemen, L. E	Denver
1892	LeMond, R. F	Denver
1887	Levy, Robert	Denver
1891	Liebhardt, Laura L	Denver
1895	Liggett, Wilbur T	Cripple Creek
1896	Little, W. T	Canon City
1890	Lobingier, A. Stewart	Denver
1896	Lof, A. J. O	Montclair
1896	Love, Minnie C. T	Denver
1893	Lowrey, Mary T	Boulder
1896	Lucy, Daniel R	Denver
1888	Lyman, C. B	Denver
1894	Mack, M. H	Denver
1896	Maclean, A. M	Leadville
1896	Macomber, G. N	Denver
1895	Mager, Hugo	Denver
1896	Mann, Alfred	Denver
1895	Maghee, Thomas G	Rawlins, Wyo.
1892	Marbourg, E. M	Pueblo
1894	Marey, F. H	Elbert
1894	Marks, A. D	Fort Lupton
1895	Mays, A. G	Victor

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Date.		
1894	Maxwell, W. J	Castle Rock
1895	Meuer, S. H	Denver
1893	Melvin, J. Tracy	Saguache
1892	Miel, Geo. W	Denver
1895	Miller, S. W	Denver
1895	Milligan, Josephine	Denver
1895	Moore, Will	Central City
1894	Moulton, G. H	Glenwood Springs
1896	Mugrage, S. G	Denver
1891	Munn, W. P	Denver
1896	Muir, Jas. T	Lake City
1894	MacLean, Luke	Leadville
1896	McLean, Donald A	Fort Collins
1895	McArthur, A. D	Littleton
1871	McClelland, W. F	Denver
1896	McCreery, R. L	Colorado Springs
1895	McDaniel, J. W	Denver
1894	McDermith, S. T	Denver
1894	McDonald, A. J	Leadville
1894	McDonald, W. J	Hugo
1892	McHugh, P. J	Fort Collins
1895	McKinzie, George	Victor
1884	McLauthlin, H. W	Denver
1891	McNaught, F. H	Denver
1896	McNeelan, M	Basalt
1894	Nelson, C. D	Denver
1895	Neuman, Daniel	Denver
1896	Nichols, Chas. B	Denver
1894	Nickerson, W. M	Denver
1882	O'Connor, J. W	Denver
1896	Osterman, Adolph J	Denver
1890	Packard, Geo. B	Denver
1885	Parkhill, Clayton	Denver
1895	Peavey, Josephine L	Denver
1896	Pedersen, E. Hyrup	Denver
1895	Pennock, V. R	Silver Plume
1887	Perkins, I. B	Denver
1894	Perkins, J. M	Denver

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Date.		
1892	Perry, B. J.	Aspen
1890	Pershing, H. T.	Denver
1885	Pfeiffer, O. J.	Denver
1882	Phillips, G. W.	La Junta
1895	Powers, Chas. A.	Denver
1893	Powers, J. J.	Denver
1894	Prentiss, J. L.	Canon City
1895	Purcell, J. W.	Denver
1877	Reed, Jacob.	Colorado Springs
1894	Rice, C. O.	Pueblo
1896	River, H. W.	Denver
1882	Rivers, E. C.	Denver
1896	Roberts, Una G.	Denver
1887	Robinson, A. J.	Aspen
1889	Robinson, J. R.	Colorado Springs
1883	Rogers, E. J. A.	Denver
1896	Rose, Henry G.	Denver
1884	Rothwell, E. J.	Denver
1884	Rothwell, P. D.	Denver
1889	Rothwell, Wm. J.	Denver
1895	Sawins, A. H.	Denver
1893	Seebass, Alfred R.	Denver
1891	Sewall, Henry	Denver
1895	Shippey, O. P.	Denver
1887	Shollenberger, C. F.	Denver
1895	Shotwell, W. E.	Denver
1895	Sigman, H. G.	Pueblo
1893	Sirois, E.	Denver
1881	Simmons, O. H.	Council Bluffs, Iowa
1896	Simon, Saling	Denver
1875	Solly, S. E.	Colorado Springs
1896	Spivak, C. D.	Denver
1895	Spratlin, P. E.	Denver
1896	Steeves, C. P.	Littleton
1871	Stedman, A.	Denver
1895	Stiver, Thomas J.	Denver
1895	Stockett, B. F.	Denver
1893	Stoddard, T. A.	Pueblo

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Date.		
1894	Stover, George H	Eaton
1879	Strickler, W. M	Colorado Springs
1892	Stuver, E	Rawlins, Wyo.
1892	Sheets, Elmer A	Denver
1892	Snitcher, H. C	Denver
1896	Taussig, Arnold S	Denver
1894	Taylor, Hannah L	Colorado Springs
1891	Taylor, Hugh L	Denver
1895	Taylor, Ralph	Denver
1889	Taylor, T. E	Denver
1878	Thombs, P. R	Pueblo
1894	Thompson, David	Denver
1896	Thorp, R. L	Denver
1896	Thorp, Chas. W	Denver
1892	Tucker, Beverly	Colorado Springs
1891	Vroom, J. N	Denver
1892	Van Meter, S. D	Denver
1892	Walker, L. M	Denver
1895	Warren, F. E	Denver
1893	Waxham, F. E	Denver
1896	Wetherill, H. G	Denver
1894	Wheeler, E. A	Denver
1873	Whitehead, W. R	Denver
1895	Whiting, J. A	Cripple Creek
1888	Whitney, H. B	Denver
1896	Wiest, Sard	Longmont
1894	Willard, J. J	Pueblo
1895	Williams, Annie W	Denver
1894	Williams, Josepha	Denver
1895	Williams, T. J	Leadville
1874	Wilson, W. E	Denver
1894	Wooding, B. F	Denver
1894	Woods, E. L	Pueblo
1889	Work, Hubert	Pueblo
1887	Worthington, A. K	Denver
1895	Wright, Charles	Denver

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HONORARY MEMBERS.

Date.		
1880	*O. D. Cass, M. D.	
1873	Hon. John Evans, M. D.	Denver
1889	Thos. F. Rambold, M. D.	St. Louis, Mo.
1879	D. H. Dougan, M. D.	Leadville
1895	Prof. John Ridlon	Chicago, Ill.
1895	Prof. Frank Norbury	St. Louis, Mo.
1895	Prof. Victor C. Vaughan	Ann Arbor, Mich.

* Deceased.

Total membership.....298

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DECEASED MEMBERS.

NAME.	Year Elected.	Age.	Residence at Death.	Date of Death.	MEDICAL COLLEGE.	Year Grad.
Lionberger, D. B.	1872	....	Denver	1873	.....	.....
Davis, S. B.	1873	....	Central City	1875	Rush Medical College University Medical College, N. Y.	1865 1866
Johnson, G. L.	1874	....	Denver	1875	Medical Department Iowa University	1872
LeCarpentier, Jules	1875	....	Fairplay	1876	University Paris	1865
Davis, M. J.	1872	....	Golden	1876	.....	.....
Thacker, W. H.	1871	....	Denver	1876	Medical Dept. University Michigan	1862
Boone, S. H.	1873	....	Denver	1877	University Louisville, Ky.	1857
Lansingh, K. V. R.	1876	....	Denver	1879	Albany Medical College	1870
Dickinson, J. S.	1871	....	Denver	1879	Royal College Surgeons, England	.....
Taylor, R. T.	1873	....	Leadville	1882	.....	.....
Gambell, F. W.	1881	....	Leadville	1882	Detroit Medical College	1873
Warn, W. H.	1879	....	Denver	1882	College Physicians and Surgeons, N. Y.	.....
Wilson, M. A.	1880	....	Denver	1882	Ohio Medical College	1866
Craven, J. S.	1880	....	Pueblo	1884	Iowa State University, Medical Dept.	1867
Griffith, D. S.	1882	....	Durango	1886	Jefferson Medical College	1863
MacLean, A. M.	1881	....	Leadville	1886	Medical Dept. University of Michigan University of Nashville, Medical Dept.	1874 1863
Mavity, W. K.	1884	....	Denver	1886	Jefferson Medical College	1865
McMurtrie, G. S.	1873	61	Denver	August, 1887	University Pennsylvania, Medical Dept.	1860
Buckingham, R. G.	1871	73	Denver	March 18, 1889	Berkshire Medical College	1836
Lathrop, Charles C.	1877	36	Denver	May 28, 1889	Bellevue Hospital Medical College	1875
Fay, William M.	1883	33	Denver	January 13, 1889	Kansas City Medical College	1881

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Brumond, P. B.	1884	43	Idaho Springs	September 13, 1889	Chicago Medical College	1868
Grimes, W. S.	1883	53	Denver	December 21, 1889	Miami Medical College	1857
James, H. C.	1881	50	Ouray	January 4, 1890	Jefferson Medical College	1870
Wooster, David	1888	37	Idaho Springs	April 8, 1891	Medical Department University of Cal.	1885
Keables, E. H.	1888	71	Alma	January 6, 1892	Bellevue Hospital Medical College	1861
Cory, J. B.	1883	54	Denver	January 24, 1892	Medical Dept. University of Michigan	1862
Worthington, R. H.	1884	46	Denver	May 13, 1892	Medical Dept. University of Denver	1884
Parker, C. M.	1873	54	Denver	August 12, 1892	University of Louisiana Medical College of Virginia	1859 1862
Wicks, E. G.,	1889	34	Denver	August 26, 1892	Medical Dept. University of Maryland	1888
Davis, J. C.	1880	66	Zurich, Switz.	October 8, 1892	Castleton Medical College	1847
Steele, H. K.	1871	68	Denver	January 20, 1892	University City of New York	1848
Williams, W. H.	1871	53	Denver	March 15, 1893	University of Louisiana	1867
Keating, J. M.	1892	42	Colorado Springs	November 18, 1893	University of Pennsylvania	1873
Finfrock, J. H.	1885	----	Boise City, Idaho	February, 1894	Medical College of Ohio	1863
Tucker, B. St. George	1880	55	Colorado Springs	March 30, 1894	University City of New York	1860
Reed, Charles M.	1894	24	Dotsero, Colo	September 29, 1894	University of Louisville	1892
Scully, D. J.	1893	33	Lindsay, Ontario	April 21, 1895	McGill University	1887
Powers, J. W.	1892	37	Salt Lake City	March 25, 1895.	Rush Medical College	1885
Jenner, C. W.	1891	55	Denver	August 11, 1895	Western Reserve Medical College	1882
Adams, B. F D.	1888	----	Colorado Springs	October 28, 1895	Harvard Medical College	1862
D'Avignon, F. F.	1880	49	Leadville	November 6, 1895	McGill University	1871
Rose, Edward P.	1892	40	Salt Lake City	November 6, 1895	South Carolina Medical College	1878
Manly, Chas. S.	1892	29	Denver	November 13, 1895	Medical Department Denver University	1891
Bosanko, S. Arthur	1885	39	Leadville	November 23, 1895	----------	----
Fearing, Sahrah J.	1895	38	Denver	January 11, 1896	Woman's Medical College, Philadelphia	1890
Cattanach, A. J.	1889	49	Denver	May 30, 1896	McGill University, Montreal	1871

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